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THE CARDINAL TEETH OF PISIDIUM.

BY V. STERKI.

It has been asserted by earlier writers that *Pisidium amnicum* Müll. and *virginicum* Gmel. have two cardinal teeth in the right valve, and mainly on the strength of that character, Clessin has established the group *Fluminina*. Some authors have ascribed that feature to other species of *Pisidium*, or even to all, indiscriminately and without examination. But the whole thing is based on a misapprehension; the fact is that the two *Pisidia* named have only one cardinal tooth in the right valve (and two in the left, like all others), and consequently the feature holds good not only for *Pisidium*, but for the whole family, *Sphæriidæ*. It might be added that if those species had really two teeth, *Fluminina* would mean a distinct genus, at least.

In young, and even many half-grown specimens, there is plainly a single cardinal tooth, strongly curved. With advancing age there appears an indentation in the middle (above), as the anterior and posterior parts are growing more. They grow also in thickness, even the thinner anterior often becomes grooved, and at the same time the whole tooth becomes more curved, resp. angular, resembling the two in the left valve (inversely). But a careful examination will show that the two shanks are connected.

On the other hand, in many specimens of *P. compressum* Pr., *variabile* Pr., etc., there is a more or less marked indentation in the middle of the right cardinal.

NEW PISIDIA FROM ALABAMA.

BY V. STERKI.

Among the latest sending of *Sphæriidæ* from Alabama and Tennessee, collected by Mr. H. H. Smith and sent for examination by Mr. Bryant Walker, there were three *Pisidia* which could not be referred to any of the established species and not to each other. The mussels are all rather small, and none shows very salient features, but sufficient to be distinct. The type lots are in the collection of Mr. Walker, and specimens of the same in the Carnegie Museum, Pittsburgh, Pa. (The numbers cited are those of my special collection of *Sphæriidæ*).

P. albidum, n. sp.—Mussel rather well and regularly inflated, oblong-rounded on the posterior margin, subtruncate, supero-anterior slope slightly marked; beaks barely behind the middle, little elevated, rather small and somewhat mamillar, rounded or slightly flattened on top; surface dull, with fine to very fine, somewhat sharp, irregular, crowded striæ, smooth over the beaks; color whitish to pale corneous with narrow straw-colored zones along the margins; shell opaque to subtranslucent, thin; hinge rather slight, cardinal teeth well formed: the right curved to somewhat angular, slightly thicker at the posterior end, left anterior angular, posterior oblique, slightly curved; ligament rather slight and short.

Long. 3.8, alt. 3.2, diam. 2.2 mill.

Long. 2.8, alt. 2.4, diam. 2 mill.

Hab.: A spring, Sparta Branch (Murder Creek drainage), 5 miles south of Evergreen, Ala. (Conecuh Co.). [No. 6739].

Most specimens in the lot were juv. to half-grown, and only few apparently mature, yet of rather different sizes, as indicated. The oblong outlines, dull surface with rather sharp striæ, and the whitish color are sufficient to distinguish this Pisidium.

P. dispar, n. sp.—Mussel short-oval to subquadrate, medium inflated with the lower part somewhat flattened; beaks barely or not behind the middle, rather small, moderately prominent; superior margin somewhat curved, bounded by a rounded angle behind, barely any in front; surface dullish waxy, striæ very fine and slight, shallow, crowded, subregular; color pale-grayish horn, with narrow straw-colored marginal zones; hinge rather slight, cardinal teeth small, the right curved, with its posterior part thicker; a deep tri-

angular excavation below it; left anterior somewhat angular, pointed, the posterior oblique, slightly curved; lateral cusps short, pointed; ligament rather slight.

Long. 3.3, alt. 2.8, diam. 2 mill.

Hale.: Flood pools by Murder Creek, 3 miles south-west of Evergreen, Ala. [No. 6742].

Of the several dozen specimens, few if any, were full-grown, probably, all were somewhat rusty colored by a slight ferruginous deposit—combined with the size and shape, and color, the "waxy" dullish surface and the very fine slight striæ are sufficient to distinguish the species.

P. inornatum. n. sp.—Mussel small, high, well inflated; beaks little posterior, rather large, rounded somewhat prominent; superior margin rather short, moderately curved, bounded by angles, supero-anterior slope steep, slightly curved, anterior end rounded, posterior margin subtruncate at nearly right angles to the longitudinal axis, inferior margin well rounded; surface somewhat glossy, striæ fine and slight, subregular; color pale-corneous, shell translucent; hinge well formed, plate rather broad; cardinal teeth thin lamellar, all situated rather high up on the plate, the right curved, its posterior part deeply bifid; left anterior angular, posterior long, nearly longitudinal, curved; "side" cusps short, pointed, rugulose; ligament rather strong.

Long. 3, alt. 2.7, diam. 2.1 mill.

Hab.: Swampy land, Roanoke, Randolph Co., Ala. [No. 6747].

Although only about half a dozen specimens, they are sufficient to be recognized as representing a distinct species.

A VACATION TRIP TO CUBA.

BY WALTER F. WEBB.

If you have been working too hard on the farm, or feel all run down from the laborious duties of an active business or professional life, my advice to you is to take the first train for New York and get aboard one of the steamers heading towards the West Indies. It does not matter much where you get off; Cuba, Jamaica, Hayti or any of the islands farther south.

I went down by train and came back by boat, and the latter is the

most restful and the cheapest. I was determined to meet my old-time correspondent, Mr. C. T. Simpson, and look over the little earthly paradise he has created with his own hands, on a little plot of 15 acres bordering Biscayne Bay. He has one of the most interesting arboretums in the country and one cannot help but admire the artistic beauty of it all, reflecting, as it does, the genius and taste of the owner.

If you want to collect land shells in the West Indies, journey to the nearest hills, cliffs, railroad cuts, etc., and you will find them in all kinds of weather. There had been no rain in two months when I was in Cuba last December and I expected to find collecting poor. I I feel sure it was a poor time from a Cuban standpoint, but comparing it with the United States it was a veritable paradise. I landed at my hotel in Havana at 11 a. m. All settled in two hours, and started for one of the nearest likely points. A misty rain set in, which lasted until 3.30, and in two hours, with the aid of a helper, quietly picked up over one thousand perfect live specimens of as handsome Urocoptis, of several species, Chondropoma, Oleacina, Helicina, etc., as one would wish to see.

The next day we visited a different locality, exploring some hollows in stone walls, some good cactus patches near the old ocean, where every bit of board end rubbish we turned over revealed from 6 to 15 fine Cerion, and our catch was nearly two thousand. Mostly Chondropoma, Cerion, Cistula, etc.

We then started for the mountains in the southwest part of the island, Pinar del Rio province. For days we wandered among limestone cliffs several hundred feet high, explored wild caves evidently the hiding places of numerous bands of guerrilas during the eight-year war, and each day was a repetition of the other. Every section would contain new species different from the day before. We were very successful with the Urocoptis, part of which were always found on the sides of cliffs, usually within 15 feet of the ground, and about an equal number of species were always found under stones and other refuse. The Megalomastomas were about three inches deep in the ground, and associated with them were numerous Chondropomas and other operculates. The Oleacinas were always under the edges of stones. Limestone fences well isolated from hills were good collecting, as even some of the large Helix were hiding there, as well as Liguus. One hollow tree was well coated with good things, and they were hiding among the cactus as well.

A trip to the Province of Matanzas we found to be most interesting. The so-called mountains contained a large list of species and they were easy to collect. It reminded me of the old days years ago, when we used to go berry-picking. For hours one could walk along the face of the cliffs, and there was always enough in sight to keep up plenty of enthusiasm, until one was so completely tired out he was ready to quit. I had a young farmer with me from Indiana, a typical Hoosier, never outside of his county before, and he declared he never was so tired in his life. I will venture to predict that after tramping over a part of the three provinces of Cuba after snails, he will have more to tell his rural friends than the average tourist. His remarks about the country and people from day to day were a constant source of amusement, especially when he was unable to get a thing to eat, in the midst of plenty. A little smattering of Spanish is a good thing to take along with you when visiting a Spanish country. My little guide-book was sometimes more precious than gold, for we were in several towns where we could not find a person who spoke a word of English, and we were equally as ignorant of Spanish.

Not feeling at all sure that the editor of THE NAUTILUS will care for such a rambling article, I will refrain from further notes; but if any reader contemplates a trip to some of the classic collecting grounds of the West Indies, I will be pleased to give them such information as I can, which will help to make the trip a source of pleasure and successful as well.

THE CLASSIFICATION OF THE EUROPEAN NAIADES.

BY DR. A. E. ORTMANN.

Through the courtesy of Mr. W. Israël in Gera-Untermhaus, Germany, I have received a great number of European Naiades with soft parts, representing practically all species known to occur in central Europe. I do not presume to judge on the validity of the numerous species described by certain European writers, but rely in this respect on the opinion of the conchologists like Kobelt, Haas, Thiele, Israël, and others, chiefly since they are at present rather unanimous in assuming only a limited number of species, divided into a larger or smaller number of forms, races or varieties. The chief object of

the present communication is to point out the essential features of the anatomy, as far as they are of systematic value. This I deem an urgent necessity, since to all appearance the anatomy and the systematic relationship of the European forms is not very well understood among the European writers.

Family Margaritanidæ Ortmann.

The chief differences of this family are found in the incomplete gill-diaphragm; in the entire lack of a tendency to approach or to unite the mantle margins to form siphons; in the structure of the gills, which lack regular septa running parallel to the gill-filaments, and consequently, in the lack of the well-defined water-tubes (ovisacs in the female); in the marsupium being formed by all four gills; and in the small size and globular shape of the glochidium, without true hooks.

The only known genus is *Margaritana* Schumacher.

Margaritana margaritifera (Linnæus). I have the soft parts of a specimen from Thuringia (Elster River drainage).

The soft parts agree in all essential points with North American specimens of this species collected by myself in Schuylkill Co., Pa. I have considered the identity of the species as established.

Margaritana sinuata (Lamarck). This species is not before me. It is the *Margaritana crassa* of Simpson (P. U. S. Mus. 22, '00, p. 667). The mistake of Simpson in using the specific name *crassus* Retzius for this species has been amply demonstrated by Kobelt (Zur Kenntnis unserer Unionen, in: Festschr. 100-jaehr. Best. Wetterauisch. Ges. Naturk. Hanau. 1908, p. 99, and: Simpson und die europaeischen Najaden, in: Beitr. Kenntn. mitteleurop. Naj., Beil. Nachr. Bl. deutsch. malakozool. Ges. no. 3, 1909, p. 43). Recently, Haas (Nachr. Bl. etc., 4. 1910, p. 181) has created the new genus *Pseudunio* for this species, and gives a description of the soft parts. Unfortunately he fails to say anything about the gill-structure. But as far as this description goes, it is absolutely identical with that of the soft parts of *Margaritana margaritifera*, and the few differences of these two species pointed out by Haas I cannot regard but as specific differences. Haas apparently overestimates the differences, while he underestimates the resemblances, aside from neglecting entirely one of the most important characters (gill structure).

Much stress is laid upon the presence of lateral hinge teeth in

Margaritana sinuata. but I see no reason, why there should not exist species of *Margaritana* with hinge teeth, in fact, this is a logical postulate, if *Margaritana* in general is a primitive genus. Similar cases of genera containing species both with and without lateral teeth are met with, for instance, in *Alasmidonta* and *Symphynota.* Thus *Pseudunio* is to be regarded as a pure synonym of *Margaritana*, and has nothing whatever to do with *Unio.* Of course, the gill structure is yet unknown, but we have every reason to expect, that it will prove to be like that of *Margaritana margaritifera*, or will be very close to it.

Family Unionidæ d'Orbigny (restr.)

This family has the following characters. The gill-diaphragm is complete; there is a tendency to approach the mantle margins at the point where the gill diaphragm reaches the mantle margins, and a tendency to unite these margins above the anal opening, so as to form an incomplete anal siphon, and leave, above it, a supraanal opening (This tendency is absent in a few North American types). The gills always have well-defined septa running parallel to the filaments, thus forming more or less regular water-tubes. In the female, in the marsupial gills, these water-tubes become ovisacs, and are much narrower than they are in the non-marsupial gills of either sex. The marsupium is formed either by all four gills, or only by the outer gills, or parts of the latter. The glochidium has various shapes, with or without hooks.

(*To be concluded.*)

BOSTON MALACOLOGICAL CLUB.

The Boston Malacological Club has just closed a most interesting season of meetings. With a membership of about thirty, the attendance has averaged twenty or more. It has been a matter of surprise to the members to see the diversity of subjects well handled by the different speakers. An idea can be had from the following as examples. Dr. Paul Bartsch on Collecting in the Philippines; Mr. F. N. Balch on Nudibranchs; Mr. C. W. Johnson on Distribution and variation of Busycon and Melongena; Mr. D. L. Belding on Economic forms in Mass.; Mr. Arthur Way on The Life of Say. Prof. Morse on Eyes in Lamellibranchs and other topics; Mr. Winkley on Mollusca and Changed Climate. We have also had exhibited interesting letters, photographs, drawings and specimens.

Henry W. Winkley, Sec.

W. G. W. HARFORD.

We regret to record the death in Alameda, California, March 1st., of W. G. W. Harford, well known to all Pacific Coast naturalists. Mr. Harford was in the eighties and, up to a very recent date, in the possession of all his faculties. He had been the associate of the Trask, Veatch, Voy, Newcomb, Stearns, and other pioneer Pacific Coast naturalists, and for a long time kept "bachelor's hall" in a small shack on Telegraph Hill, with the late beloved botanist Dr. A. Kellogg; practically realizing the Scotch ideal of high thinking "on a little oatmeal." He was long a curator at the Academy of Sciences, San Francisco, and earned a precarious livelihood by collecting seeds, plants and other objects of Natural History, and by minor appointments at the University and other scientific institutions. He was especially interested in Conchology and was appointed naturalist to the U. S. Coast Survey expedition to Alaska in 1867 under the direction of Professor George Davidson; his report is printed in the Annual Report of the U. S. Coast Survey for 1867, Appendix 18.

He printed little and his life was devoted to helping others in their researches. Over six feet in height, of a Lincolnian gauntness, and a pioneer style of luxuriant beard and bushy eyebrows, his familiar figure will be missed by the old members of the California Academy, to whose meetings he was perennially faithful.

W. H. D.

PUBLICATIONS RECEIVED.

The Lymnæidæ of North and Middle America, Recent and Fossil. By Frank C. Baker (Chicago Academy of Sciences, Special publication No. 3, Feb. 15, 1911.) Pages xvi + 539, 58 plates). This handsome publication is the outcome of several years of study by Mr. Baker, in the course of which all of the large collections in this country containing type specimens have been examined. Chapters on the morphology, ecology, distribution, classification and nomenclature, and descriptions of fossil species, precede the systematic descriptions of the recent species, 65 in number, besides numerous subspecies.

85 species and varieties occur between latitude 38° and 60°; 13 occur north of 60°, 29 between 38° and 30°, and only 7 south of

30°. The 105th meridian roughly divides the eastern from the western Lymnæid fauna, only 17 species and varieties being common to both. The highest development of the group is in the glaciated portion of the continent.

The classification adopted presents several interesting features. Following Dybowski and some other European authors, Mr. Baker separates the *Planorbidæ* and *Ancylidæ* as families distinct from the *Lymnæidæ*, on the basis of differences in the shell and soft anatomy, which seem amply to justify that view.

The genus Lymnæa, as hitherto used in this country, is divided into the following genera and subgenera :

Genus *Lymnæa* Lamarck, type *L. stagnalis.*

" *Pseudosuccinea* Baker, type *L. columella.*

" *Radix* Montfort, type *L. auricularia* (Europe).

" *Bulimnea* Haldeman, type *L. megasoma.*

" *Acella* Haldeman, type *L. haldemani* (*L. gracilis* Jay).

" *Galba* Shrank, type *L. truncatula.*

Subgenus *Simpsonia* Baker, type *L. humilis.*

" *Stagnicola* Swainson, type *L. palustris.*

" *Leptolimnæa* Swainson, type *L. glabra* (European).

" *Polyrhytis* Meek, type *L. kingii* (fossil).

Genus *Pleurolimnæa* Meek, type *L. tenuicosta* (fossil).

The genus *Galba* contains nearly all of our species, *Lymnæa* and *Pseudosuccinea* each having two, *Bulimnæa* and *Acella* each one species. The genera are based upon quite readily recognized shell features, and rather small but apparently constant differences in the soft anatomy, chiefly the genitalia and teeth. The anatomical differences between the genera are not so great as are generally recognized as generic in the land snails, since they consist mainly of differences in the proportions of certain organs, rather than in the possession or absence of structures ; yet their value in classification depends upon their constancy in long series of species. Many more forms should be dissected with this in view. At present the evidence seems to favor recognition of the several genera in the Lymnæa group defined by Mr. Baker.

Numerous figures are given of the dentition, jaws and genitalia of American species,—one of the most valuable features of the work. In the terminology of the genitalia we would suggest a change, in order that it may conform to the usage in writings on land pulmo-

nates. The "penis sac" of Mr. Baker's descriptions is the *penis*, while the *non-invertible* tube surmounting it, which he designates "penis," seems strictly homologous with the *epiphallus* of land snails. Since these distinctions were introduced by the writer in 1892, they have been adopted universally by workers on land snail anatomy, and in the interests of uniformity it seems well to use the same terms in aquatic pulmonates.

In his attitude toward species Mr. Baker sides with the "splitters," quite as frankly as Binney, in Land and Fresh-water Shell II, inclined towards the "lumpers." It may turn out that the author has attached too much importance to local forms, and failed to make due allowance for variation of the same specific type under varying special conditions. Yet after all, the question is not one for a snap judgment; the status of each form must be decided separately, and often by local study, where the influence of local conditions on the associated species can be taken into account. It usually turns out that a work of this nature raises more questions than can be settled by a generation of conchologists. One of its valuable features is in stimulating investigation of the vast variety of forms shown to exist, of the correlation of shell-characters with ecologic factors, etcetera.

Many new species and subspecies, most of them originally described in this journal, are illustrated here for the first time by excellent photographic figures, which occupy 34 of the 58 plates, the others being devoted to anatomical and ecologic illustrations. The facts of distribution are graphically summarized by many maps printed in the text. H. A. P.

DESCRIPTIONS OF NEW MOLLUSKS OF THE FAMILY VITRINELLIDÆ from the west coast of America, by Paul Bartsch. (Proc. U. S. Nat. Mus., vol. 39, pp. 229–234. 1911.) *Cyclostroma baldridgei* (Gulf of Cal.); *C. miranda* (San Pedro); *C. adamsi* (Panama); *Circulus liriope* (Gulf of Cal.); *C. diomedeæ* (Panama); *Cyclostromella dalli* (Gulf of Cal.), are the new species described.

THE RECENT AND FOSSIL MOLLUSKS OF THE GENUS ALABINA from the west coast of America, by Paul Bartsch. (Proc. U. S. N. M., vol. 39, pp. 409–418. 1911.) Seven new species and two subspecies of this genus of minute Bittium-like shells are described from the recent and Tertiary faunas, and all of the known species are reviewed. Like the last paper, this is illustrated with excellent line engravings.

New species of shells collected by Mr. John Macoun at Berkley Sound, Vancouver Island, B. C. By William H. Dall and Paul Bartsch. (Canada, Dept. of Mines, Memoir no. 14-N. 1910.) In reporting upon this collection—the first to be made on the ocean side of Vancouver Island—attention is called to the interesting fact that the inland passages of this region, "perhaps affected by the discharge of cold water from glacier-fed streams, and the shutting-off of the sun's rays from the narrow passages by their mountainous shores and prevalent fogs, is markedly of a more boreal character" than the ocean coast. New species are described in the genera, *Leda*, *Bela*, *Mangilia*, *Boreotrophon*, *Epitonium*, *Turbonilla*, *Odostomia* and *Bittium*, all figured.

NOTES.

Spondylus echinatus Martyn.—I have recently received from Mr. J. H. Holmes some fine examples of *Spondylus echinatus*, which also rival in size and beauty the *S. pictorum* of the Gulf of California. One of the specimens measures five inches in length, and Mr. Holmes writes that "some are six inches long." They were obtained in ten fathoms near Rock Island, one of the Anclote Keys, Florida.—C. W. Johnson.

Lymnæa auricularia in Ohio.—On March 21st last I found *Radix auricularia* L. in numbers in a marshy stream forming the northeast border of Toledo, Ohio, less than 100 feet from Maumee Bay, Lake Erie. The shells were in two to eight inches of water, moving slowly about on the bottom, upon sticks, and some, afloat at the surface, were in the position of coition. Dead shells of *auricularia* were found also on the marshy borders of a bayou farther to the north. Near this bayou are several greenhouses and I am informed that it is the custom of the florists to import potted azaleas from Holland and Belgium. In this way eggs may have been brought here and reached the open water through drains. The presence of a large colony and the indications that another exists close by would appear to bear out the comment of Mr. Frank Collins Baker, in his recent work upon the *Lymnæidæ*, that "there is no reason why it (*auricularia*) would not thrive in the ponds and rivers of certain favorable localities of this country."

It is an interesting coincidence that that fecund traveler, *Bythinia tentaculata*, is the most common shell to be seen on the mud flats of these two marsh areas.—Calvin Goodrich.

Polygyra monodon cava n. subsp. The shell is larger than *P. m. fraterna;* more openly umbilicate, deeply impressed or excavated around the umbilicus. Parietal tooth short, its ends about equally remote from the terminations of the lip. Fulcrum well developed, notched above and below. Whorls 5½. Pilosity fine and short, about as in *P. m. fraterna.* Alt. 6, diam. 10.5 mm.

Types No. 90127 A. N. S. P., from Cazenovia, Madison Co., N. Y., collected by Messrs. Henderson, Walker, Clapp and Pilsbry, 1905.

A recent review of specimens in the collection of the Academy of Natural Sciences shows the existence of a rather large and openly umbilicate race in the Transition Zone, from Maine to Minnesota, extending into Ontario. It coincides in part with the range of *P. monodon* and *P. m. fraterna*, but does not extend so far south. It intergrades to some extent with *fraterna*, but in most cases the two are readily separable.

In this connection it may be noted that with the exceptions of *P. m. cincta* and *P. m. imperforata*, the several races of *monodon* intergrade more or less. The following races form a series in which each member is connected to the forms immediately following and preceding: *monodon, aliciæ, friersoni, fraterna, cava, cincta.*

Also in the collection of the Academy of Natural Sciences from the following places: Ottawa, Ontario (F. R. Latchford). Maine, Woodland, Aroostock Co., (O. O. Nylander); Knox Co., (N. W. Lermond); Fairfield (J. H. Thomson); Buckfield, Oxford Co., (John A. Allen). Willoughby L. Vermont (A. D. Brown); Mass., (Dr. Mighels); N. Y., Herkimer Co., (A. Bailey); Chittenango Falls; Cazenovia, Madison Co., (H. A. Pilsbry etc.)

Md., Foot hills of Martin's Mt., Cumberland Co., (H. A. Pilsbry & J. Ives). Va., Harper's Ferry, (G. W. Tryon) Mich., Grand Rapids (A. O. Currier); E. Saginaw, (Lathrop) Minn., near Albert Lea, (H. Hemphill); Iowa, Des Moines, (T. Van Hyning); Marshallton, (Rev. R. B. Kendig).

The lowest figures on plate 41 of Terr. Air-breathing Moll. U. S. Vol. III, seem to have been drawn from a specimen of this variety.—*Pilsbry & Vanatta.*

The Nautilus.

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THE DISTRIBUTION OF OAHUAN SPECIES OF AMASTRA.

BY HENRY A. PILSBRY.

The genus *Amastra*, comprising dull ground-snails of Achatinellid type, is found throughout the Hawaiian group from Kauai to Hawaii, but is rather sparingly developed on the two terminal islands, reaching its maximum in the intermediate islands, where special groups have been differentiated. In this intermediate region there have been two main centers of evolution, the one composed of Maui, Molokai and Lanai, the other of the single island Oahu. Common to these two centers are the group *Cyclamastra* (represented by small umbilicate species, like *A. umbilicata*, now mostly extinct), and its derivative *Pterodiscus*.

The two centers are roughly comparable topographically. Oahu consists of two mountain ranges, a western (Waianae range) and a much longer northeastern or Main Range, separated by a lower tract, not forested, and supporting no Amastræ. In the other center, Molokai + Maui represent the Main Range of Oahu, Lanai the Waianae range; only there has been subsidence isolating the component ranges. This may seem an idle analogy; but it was suggested by the facts of molluscan distribution. Lanai by its Amastræ holds such a relation to Molokai as the Waianae range to the western end of the main range; while Molokai, west Maui and east Maui are almost as closely related in their Amastræ as corresponding segments of the Main Range of Oahu, if this was broken by dropping out a few valleys in two places.

Omitting a few species of which the exact locality is unknown, and

for the time ignoring the numerous " varieties " or subspecies, Oahu has 28 species of *Amastra* in the Main Range, 15 in the Waianae Range. Such a proportion seems natural in view of the comparative magnitude of the two ranges. The species fall naturally into five series, which may be called the *umbilicata* series, the *undata*, the *cornea*, the *inflata* and the *spirizona* series.

The *undata* series belongs to the Main Range, especially its eastern half, where it is developed in a great variety of forms. Two of the fourteen species have been found in the Waianae range, one of them, *Amastra albolabris* unchanged, and another represented in the Waianae Range by two varieties of *A. reticulata*, not very different from the presumably parent form of the species in the main range.

The *inflata* series is also wide-spread in the Main Range, but one variable species, *Amastra rubens*, has several varieties in the Waianae range, and one Waianae species, *A. porcus*, is distinct from any in the Main range, though probably related to *A. tristis*.

The small *cornea* series has three species, one of them fossil, in the Waianae Range, and one very rare species, *A. æmulator* Pils., has recently been turned up in the Main Range.

The *spirizona* series comprises seven species in the Waianae Range. *Amastra porphyrea* Nc. is found also in the Main Range, where there is moreover a distinct but related species, *A. porphyrostoma*. *A. spirizona* of Waianae has several varieties in the Main Range—*nigrolabris*, *chlorotica*—and one derivative species, *A. turritella*. The last is the only form which has extended into the eastern end of the Main Range.

In dealing with groups of closely related species in limited areas there cannot be much chance of error in holding that the region of greatest variety and abundance of strictly localized specific forms has been the center of differentiation of those forms. If so, it may be seen that the *undata* and *inflata* series had their rise in the Main Range and the *cornea* and *spirizona* series in the Waianae Range.

To evolve so large a variety of species, many of them strongly individualized, the two ranges must have existed as separate tracts for a long time. It favors this view that fossil forms are found in both ranges. Whether the separation was by water, or by a land surface unfavorable to forest-snails, we have at present no means of

knowing. This long period of separate evolution we further infer, was followed by a brief period of union during which forests extended from the Waianae mountains across the valley to the western part of the Main Range. This connection must have been quite recent, within the life of existing species, for in several cases the same species is found in both ranges. A few forms have been specifically differentiated since the migration, or possibly they may have died out in the original area. At the present time the forests have receded up the mountains, and no migration from range to range is possible. Moreover, there has doubtless been extinction of many forms which once inhabited the lower region.

Most of the migrating species are exceptionally virile forms, shown by their rather wide distribution and tendency to form varieties in their home ranges. Such are *A. spirizona*, *A. rubens*, *A. reticulata*,[1] *A. crassilabrum*.

In the following list of Oahuan Amastræ the Main Range species are given in the left, Waianae species in the right column. A few species of unknown habitat and some named varieties are omitted as unessential.[2] The new names for the latest discoveries of Messrs. Thaanum and Spalding and Dr. Cooke will be defined in the next number of the Manual of Conchology. Names of fossil species are prefixed thus †.

Forms which are believed to have originated in the Main Range are printed in Roman type; those of Waianae origin in *Italics*.

Main Range.	Waianae Range.
(*Series of A. umbilicata.*)	
Sola.	
† Antiqua (Ewa)	? *Heliciformis* Thwing.[3]

[1] *Amastra reticulata* was first named from the derivative migrant in the Waianae Range, instead of from the descendants of the parent stock in the Main Range, a circumstance which might lead to an erroneous idea regarding the origin of the several forms.

[2] *Achatinella elongata* Newc., an Oahuan species, has been omitted for want of a knowledge of the apical sculpture to fix its systematic position. It may be a sinistral member of the *spirizona* group, related to *A. tenuispira*, or it may possibly prove to belong to the group of *A. soror*.

[3] Mr. Thwing has figured as *Amastra heliciformis* Ancey a shell resembling *Amastra agglutinans* Newc., of Maui. It can hardly be Mr. Ancey's species, which belongs to *Pterodiscus* (see Manual of Conchology, pl. 36, figs. 1, 2, 3), and is much more depressed than Thwing's figure. See Occasional Papers B. P. B. Museum, III, no. 1, pl. 3, fig. 17.

Main Range.	Waianae Range.
† Extincta (loc. uncertain).	
† Hartmani (loc. uncertain).	
(Series of A. undata.)	
Textilis.	
Gulickiana.	
Spaldingi.	
† Caputadamantis.	
Pellucida.	
Irwiniana.	
Davisiana.	
Thaanumi.	
Reticulata orientalis.	Reticulata.
Reticulata errans.	Reticulata dispersa.
Cookei.	
Transversalis.	
Albolabris.	Albolabris.
† Vetusta.	
Undata.	
Badia.	
(Series of A. cornea.)	
	Cornea.
	† *Subcornea.*
Æmulator	*Crassilabrum.*
(Series of A. inflata.)	
Rubens kahana.	Rubens.
Rubens infelix.	Rubens corneiformis.
Rubens seminigra.	Rubens castanea.
Tenuilabris.	
Tenuilabris rubicunda.	
Luctuosa.	
Decorticata.	
Inflata.	
Rubida.	
Elliptica.	
Tristis.	Porcus.
(Series of A. spirizona.)	
	Frosti.
Turritella.	*Tenuispira.*
Spirizona acuta.	

Main Range.	Waianae Range.
Spirizona nigrolabris.	*Spirizona.*
Spirizona chlorotica.	
	Intermedia.
Porphyrea.	*Porphyrea.*
Porphyrostoma.	*Cylindrica.*
	Variegata.

THE LAND MOLLUSCA OF SAN MATEO POINT, CALIFORNIA.

BY HARRY EDSON.

San Mateo Point is a heavily-wooded knoll containing about one and one-half acres of ground, on the San Francisco bay coast midway between San Mateo and Burlingame. It is practically an island as far as the land mollusca are concerned, being entirely surrounded by water and salt marsh with the exception of a wagon road that during the rainy season, the only time the snails travel in California, is covered with water most of the time, so that there has been no very recent addition to the molluscan fauna, which is rather large considering the area of the collecting ground, and that the nearest place any molluscs are found is over three miles away with the town of San Mateo and the salt marsh intervening.

List of Species.

Epiphragmophora arrosa, Gould, found in large numbers on the western or bay side exposure. I was unable to find any on the opposite side.

This species showed a very great variation, running from a very dark shell with no superior color band to a light-colored shell with dark band, also an albino form some without any band and others banded, one of the latter had a bright orange band.

Epiphragmophora nickliniana, Lea. This shell was found rather sparingly, buried under the debris in some small water channels running from the center of the point.

Circinaria vancouverensis, Lea, a few specimens found on the west side.

Circinaria duranti, Newc., found on a little hill in the center of the point that the Indians had evidently used as a place to hold clam bakes.

Punctum conspectum, Bland, found in large numbers around the roots of the Eucalyptus trees on the east side.

Zonitoides minuscula, Binney, found at the roots of the Eucalyptus trees.

Mr. E. W. Gifford[1] reported finding *Epiphragmophora fidelis*, Gray, at San Mateo Point, but I regard this as erroneous as the farthest south it is known is the form *infumata*, Gould, found as far south as Santa Rosa. As there is no land connection between there and San Mateo Point, the only explanation would be that they were washed into the bay on a log or a tree and drifted to the point; but this is highly improbable, as they would have to stand immersion in the salt water for many days, and I am positive that it does not occur there now, so it is quite probable that he mistook one of the light forms of *Epiphragmophora arrosa*, Gld., for *fidelis*, Gray.

NOTES ON OREOHELIX.

BY L. E. DANIELS.

During the fall of 1909 in company with J. H. Ferriss, I collected snails in the Kaibab Mountains and the Grand Canyon of the Colorado. *Oreohelix strigosa depressa* Ckll. was the most abundant species north of the canyon, *O. yavapai* Pils., on the south side.

A few notes may be of interest to the readers of THE NAUTILUS.

Oreohelix is viviparous, and when cleaning the shells if I observed one that was gravid I made note of the number and color of the embryos.

The first *Oreohelix s. depressa* collected was on August 28th on Powell Plateau, and when cleaned nearly one-third were found to be gravid, with from four to eight young in each shell, the young consisting of from one and one-half to two and one-half whorls; all of the adult shells were brown with dark bands, and the young were all brown. Very few of the embryonic shells show bands and then only a faint trace.

The last station, Spectacle Cove in the Grand Canyon, was collected on October 23d, the number taken was 456 *O. yavapai*. Only ten were gravid, or one in forty-five. Six of these contained two, three contained three and one four embryos. This lot was

[1] NAUTILUS, XIV, page 144, 1901.

hibernating and was not cleaned until January 15th after returning home. Of this lot of ten shells, six were brown with darker stripes, and four were white or albino. Five of the brown shells contained brown embryos of from two to three in each, the other brown shell contained three *brown* and one *white;* two of the white contained two *brown* each; one white contained two *brown* and one *white*, and the remaining white one contained two *white*. Whether the small number in each shell of this lot tends to show that a portion of the embryos may have been extruded and the remainder would have been carried until the returning spring, I cannot say, or it may be that this particular colony would not produce as many young, as the adult shells are not more than two-thirds the size of those from most of the other stations.

At a station in Quaking Asp Canyon, Kaibab Mountains, four of the shells of *Oreohelix strigosa depressa* were gravid, three brown with dark bands and one white. One brown shell contained five *brown;* one brown contained nine *brown;* the other brown shell contained three *brown* and two *white*, and the white shell contained five *brown* and two *white* embryos. These shells were hibernating, and they were collected on October 14th and opened January 15th, 1910.

At twelve stations taken at random the number of young ranged between five and twelve from each shell. One shell from another station contained twenty embryos. All of the shells taken at these thirteen stations were brown with dark bands and the embryos were all brown.

In this connection I might say that in the fall of 1907 I collected in the Huachuca Mountains. The species of Oreohelix there being *strigosa concentrata* (Dall) and *strigosa huachucana* (Pils.). I did not see a single albino and none among the embryos.

Query: In the light of the above notes what is to be done with varieties *alba* and *rubra* among the species of snails.

A GIANT ADMETE FROM BERING SEA.

BY WILLIAM H. DALL.

Among the collections made by me more than thirty-seven years ago in Bering Strait and at Plover Bay on the Siberian side of the

Strait a number of species of shells were procured, some of which are widely distributed in the boreal seas while others are local. Many of the specimens were exceptionally large, larger than others of the same species collected elsewhere. In sorting the material, which has been all these years in alcohol, a remarkable new species of *Admete* was found, of which the description follows:

ADMETE REGINA n. sp.

Shell large, solid, white, with a coffee-colored periostracum and five or more whorls, the apex in every case being more or less eroded; spiral sculpture of fine, even-channeled grooves with flattened or even slightly concave wider interspaces, covering the whole shell except a space between the suture and the shoulder of the whorls; there are about two grooves and an interspace to a millimeter; axial sculpture of a few feeble often more or less obsolete, irregular, low plications, not quite reaching the middle of the whorl; suture very deep but not channeled; whorls moderately rounded; base attenuated, with a narrow, deep umbilical perforation; outer lip simple, hardly thickened, throat white, smooth, body with a smooth, white layer of callus; pillar concavely arcuate, with six or more feeble plaits, the anterior end of the pillar projecting over a deep notch.

Height of shell 36, last whorl 27, of aperture 20, max. diam. 22 mm.

Type No. 221473, U. S. N. Mus.; dredged in Plover Bay in 25 fms., hard bottom, by W. H. Dall in 1874.

THE CLASSIFICATION OF THE EUROPEAN NAIADES.

BY DR. A. E. ORTMANN.

(*Concluded from page 7*).

I have divided the family *Unionidæ* into three subfamilies, only two of which are found in Europe (compare: Nautilus, 23, Febr. 10, p. 114–120).

Subfamily: UNIONINÆ Swainson (restr.)

Supraanal opening rarely not separated from the anal, generally well separated. Marsupium formed by all four gills, or only by the outer ones, when charged only moderately swollen, and its edge not

distending. No secondary watertubes developed within the marsupium. Glochidia rather small, either semioval or semielliptic, without hooks, or subtriangular, with hooks.—These forms have a short breeding season.

The typical genus is *Unio* Retzius, of which the European species *Unio pictorum* (Linnæus) is the type.

Unio pictorum (Linnæus). A large number of specimens is at hand, from various parts of Germany and Hungary, representing several "forms."

The anatomy is typical for the family: the supraanal is well separated from the anal by rather long mantle-connections. The marsupium is formed by the outer gills alone, and according to the structure of the edge of the gill, it does not seem capable of distending, when charged.

No gravid females are at hand, but according to various authors, the breeding season is short, and the glochidia are subtriangular, with hooks.

This latter character distinguishes the European genus *Unio* from the genus bearing the same name in North America. In addition, in the latter, the mantle-connection between the anal and supraanal is generally shorter, and the shell chiefly the beak sculpture, is fundamentally different. Thus we cannot place the North American species in the same genus, and I have concluded to use for them the name *Elliptio* Rafinesque.

Unio tumidus Retzius (about 10 specimens from Germany and Hungary at hand); *U. crassus* Retzius (many typical specimens from Thuringia), and the probably conspecific forms: *batavus* Maton & Racket (5 specimens from Germany and Hungary), and *consentaneus* Rossmaessler (one male from Bavaria), have essentially the same anatomical structure as *U. pictorum.* A specimen of *U. batavus* from Hungary had the outer gills partly filled with eggs. No lateral water-tubes were observed.

Subfamily: Anodontinæ Ortmann.

Supraanal always well separated from the anal opening, generally by a very long mantle-connection. Marsupium formed only by the two outer gills, when charged greatly swollen, and an extra thickness of tissue at the edge permits them to distend. Within the watertubes of the marsupial gills, lateral (secondary) water-tubes, lying

toward the faces of the gill, are developed during the breeding season, while only the central part of each original water-tube is used as ovisac. The ovisacs are closed also at the base of the marsupium. Glochidia rather large, subtriangular, with hooks.—These forms have a long breeding season.

Also of this subfamily, the typical genus is European, and the type-species is *Anodonta cygnea* (Linnæus) of Europe.

Anodonta cygnea (Linnæus). I have a large number of specimens, of both sexes, the females sterile or gravid, with eggs as well as with glochidia, in my hands. They represent various forms of this polymorphous species (*piscinalis*, *fluviatilis*, *anatina*, *cellensis* etc.), but I agree with certain European writers in regarding them all as *one* species. At any rate, in the anatomical structure, they are all alike.

The soft parts of this species correspond to the characters given for the subfamily above in every detail, and it is not necessary to describe them again, except to make the statement that the anal and supra-anal openings are separated by a very long interval. It may also be mentioned that I possess slides of this species, which show the formation of the lateral water tubes of the marsupium most beautifully, rendering it beyond doubt that these tubes are actually cut off from the original water-tubes.[1]

Anodonta complanata Rossmaessler. I have six specimens from Bavaria, among them two males, one sterile, and three gravid females, the latter with glochidia.

The structure of the soft parts is absolutely like that of *A. cygnea* in all essential points. For this species the genus *Pseudanodonta* has been created by Bourguignat, which recently has been taken up as valid by Haas (Najadenfauna des Oberrheins, in: Abh. Senckenberg. Naturf. Ges. 32, 1910, p. 170, and Pr. Malacol. Soc., g., 1910, p. 110). The characters originally given by Bourguignat, and added to by Germain (see Haas), are taken from the shell, and, aside from the compressed shape of the latter, are entirely *imaginary*. Later on, the shape of the glochidia was added (Schierholz) as a further difference, and (by Clessin) the structure of the gills, in terms which

[1] An epithelial fold each on two opposing faces of two septa grows into the lumen of the water-tube, and these two folds come into contact. In this species I have not seen them firmly united, as in other species, although this undoubtedly will be the case when they are fully developed.

are hard to understand, and the meaning of which can only be guessed. The latter were referred to by subsequent writers by the mysterious words that there are "anatomical" or "histological" differences. My own investigations have convinced me that all anatomical or histological elements in the gill-structure of *A. complanata* are essentially the same as in *A. cygnea*, the only actual difference being a slighter development of the interlamellar tissue in *A. complanata*. And further, the shape of the glochidium is indeed slightly different, that of *A. cygnea* being a little larger, and higher in proportion to length. For the rest, *A. complanata* is absolutely like *A. cygnea*, and the general shape of the shell, chiefly the conformation of the beaks and their sculpture, indicates clearly that *A. complanata* is not only a true *Anodonta*, but also belongs to the same group of the genus, of which *A. cygnea* is the type (as distinguished, for instance, from the North American group of *A. grandis*). The very slight differences in the anatomy alluded to above, and in the glochidium, cannot be regarded as of more than specific value. *Pseudanodonta*, consequently, is a synonym of *Anodonta*, and I must confess that I rarely have come across a more useless and superfluous genus.

I hope to find occasion, in the future, to give a more detailed and illustrated account of the European forms discussed here, and very likely shall do so in connection with my studies of the soft parts of a number of North American forms, in which I am now engaged.

PUBLICATIONS RECEIVED.

THE RECENT AND FOSSIL MOLLUSKS OF THE GENUS CERITHIOPSIS FROM THE WEST COAST OF AMERICA. By Paul Bartsch (Proc. U. S. Nat. Mus., vol. 40, May 8, 1911). Former work on the forms is reviewed, followed by a classification of the species into the subgenera *Cerithiopsis* proper, *Cerithiopsina*, *Cerithiopsidella* and *Cerithiopsida*, based upon characters of the embryonic and early neanic whorls. Of 44 species known from the west coast of North and South America, five occur only fossil, and 25 are described as new. All the species are illustrated by photographic figures. It is an important work on a difficult and hitherto little-known genus.

NEW SPECIES OF SHELLS FROM BERMUDA. By W. H. Dall

and Paul Bartsch (Proc. U. S. Nat. Mus., vol. 40, May 8, 1911). The new forms are :

Mitra haycocki.	Cerithiopsis movilla.
Columbella somersiana.	Cerithiopsis ara.
Aclis bermudensis.	Cerithiopsis pesa.
Turbonilla bermudensis.	Fissuridea bermudensis.
Turbonilla peilei.	Odostomia nioba.
Turbonilla haycocki.	Ischnochiton bermudensis.

Columbella somersiana is a remarkably large form of the *Mercatoria* group, described from an immature shell 24 mm. long. All the species are well illustrated.

Bibliography of the Scientific Writings of R. E. C. Stearns. By Miss Mary R. Stearns; with biographical sketch by William H. Dall (Smithsonian Misc. Coll., vol. 56, no. 18, 1911). 156 papers are recorded as published during a long life of varied scientific activities, 111 relating to Mollusca, the others divided between Cœlenterata, Agriculture, Forestry, Ethnology, et cetera. Many of Dr. Stearns's shorter articles were published in the Nautilus. A good portrait, probably sat for about 1895, illustrates this paper, which will be especially useful to those working with west coast mollusks.

NOTES.

Note on Lymnæa florissantica. In his very valuable work on the Lymnæidæ, Mr. F. C. Baker has made a curious error in reference to *Lymnæa florissantica.* I sent him a photograph I happened to have representing the cast of the body whorl of the type, in the American Museum of Natural History. Through some misunderstanding, he figured as the fossil a shadow on the photograph, which accidentally resembles a shell. We have here at the University of Colorado the reverse of the specimen photographed, showing the outline nearly complete, the spire, etc., and also a more perfect but smaller specimen collected since. These confirm my original conception of the shell, and show that it does not at all resemble *L. palustris.* It is proposed to publish good figures in connection with a general account of the fossil land and freshwater mollusca of Colorado, later in the year.

It is worth while to add that *L. florissantica* shows a very strong general resemblance to *Lymnæa pachygaster* (Thomé), which I collected in the Miocene beds at Wangen, Baden, the year before last.

The types of *L. scudderi* and *sieverti* are at the American Museum of Natural History, not at the University of Colorado, as Mr. Baker has it.—T. D. A. Cockerell, *University of Colorado, Boulder.*

The Nautilus.

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A NEW LEPTOTHYRA FROM CALIFORNIA.

BY WILLIAM H. DALL.

Mr. C. W. Gripp, of San Diego, Cal., recently obtained from a fisherman a stone hauled up on a fishing-line from the rock-cod banks off the entrance to San Diego harbor, in 100 to 150 fathoms. On this stone, beside corallines, annelids, etc., were several mollusks, *Placobranchus* (*Oscaniella?*) *californicus* Dall, *Crepidula nummaria* Gould, a *Saxicava* and two specimens of a *Leptothyra*, which is undescribed and markedly different from any other species of that genus known to the Coast. Both specimens were immature, but the older one lacks merely the thickening of the aperture which comes with maturity. Both contained the operculum.

Leptothyra grippii n. sp.

Shell small, solid, of about five whorls; the apex slightly flattened, nepionic whorls one and a half, small, nearly smooth, whitish; sculpture on the spire on the second whorl three, increasing to five on the last whorl, strong, prominent, squarish spiral cords, articulated in the type with crimson and white, the interspaces at first smooth, on the later whorls with one to three intercalary much smaller spiral threads; on the last whorl between the peripheral cord and the next posterior cord five uniform fine threads, though this feature is probably variable; base flattened, translucent white, with one articulated crimson and white color band around the umbilical region, which is also white; pillar broad, white, with one prominent knob of callus in the middle of it; throat brilliantly pearly; the whorl is laid slightly above the

peripheral cord, which is covered by the advancing whorl; body color crimson; faint spiral striæ on the flattened base; axial sculpture only of incremental lines. Height of shell 5.25; of last whorl 4.0; max. diameter 6.0 mm. Operculum as usual in the genus, with about three whorls.

THE MOLLUSCAN FAUNA OF NORTHAMPTON COUNTY, PENNSYLVANIA.

BY G. W. CAFFREY.

So far as is known to the writer no list of the mollusca of this county has been published up to this time. The species named in the following list have been found within the county, and nearly all occur in the vicinity of Bethlehem, as well as in other localities explored.

Helix appressa Say, described by Hartman in "Conchologica Cestrica" as occurring "under flat stones on the Lehigh River," has not been found by the writer, though diligently sought along that stream from Bethlehem to its confluence with the Delaware River at Easton.

The physical conditions in the Lehigh Valley and adjacent lands are favorable to the development of the shell-bearing mollusca, limestone being abundant, and the waters strongly impregnated with that mineral. The limestone cliffs, old quarries and abandoned limekilns found on nearly every farm, afford good collecting ground for *Helicidæ* and *Pupillidæ*.

Limacidæ.

Limax maximus L. Bethlehem.

Limax agrestis Müll. Bethlehem, W. L. King.

Limax campestris Binn. Bethlehem.

Zonitidæ.

Gastrodonta gularis Say. One specimen in drift on Monocasy Creek.

Gastrodonta suppressa Say. Monocasy Creek.

Zonitoides nitida Müll. Bank of Monocasy Creek.

Vitræa cellaria Müll. Rare, West Bethlehem, bank of Monocasy Creek, W. L. King.

Zonitoides arborea Say. Common.

Vitrea indentata Say. Uncommon, Bethlehem.

Vitræa viridula Mke. (*radiatula* Alder). Rare, Bethlehem.

ENDODONTIDÆ.

Pyramidula alternata Say. Common, Bethlehem. Specimens of a creamy-white, lacking the usual markings, have been found on the Monocasy Creek.

Pyramidula striatella Anthony. Common, Bethlehem.

Helicodiscus lineatus Say. Quarries and limey situations, Bethlehem.

HELICIDÆ.

Polygyra (*Mesodon*) *thyroides* Say. Frequent, Bethlehem.

Polygyra (*Mesodon*) *albolabris* Say. Common, Bethlehem.

Polygyra (*Triodopsis*) *tridentata* Say. Common, Bethlehem.

Polygyra (*Triodopsis*) *introferens* Bland. A single specimen (not *inflecta*), Bethlehem.

Polygyra (*Stenotrema*) *monodon fraterna* Say. Common, Bethlehem.

Polygyra (*Stenotrema*) *hirsuta* Say. Common, Bethlehem.

Vallonia pulchella Müll. Common, Bethlehem.

Vallonia costata Müll. Not common, Bethlehem.

PUPILLIDÆ.

Pupa armifera Say. Very common, Bethlehem.

Pupa marginata Say (*fallax* Binney). Numerous in one locality, Bethlehem.

Pupa contracta Say. Common, Bethlehem.

Pupa pentodon Say. One or two specimens, Bethlehem, W. L. King.

Pupa corticaria Say. Under bark of dead willow tree, Monocasy Creek, rare, Bethlehem.

Vertigo ovata Say. Rare, Bethlehem.

Vertigo milium Gould. Two specimens, Bethlehem.

FERUSSACIDÆ.

Cochlicopa lubrica Müll. (*Ferussacia subcylindrica* Auct.). Under decaying leaves, woods north of Bethlehem.

Caecilionella aciculo Müll. Lehigh Mountain, contiguous to Fountain Hill Borough, spreading from greenhouses; also found by Mr. W. L. King in his yard in Bethlehem.

SUCCINEIDÆ.

Succinea obliqua, Say. Common, Bethlehem.
Succinea avara Say. Damp meadows on Monocasy Creek.

PHILOMYCIDÆ.

Philomycus carolinensis Bosc. Freemansburg, Pa.

AURICULIDÆ.

Carychium exiguum Say. Bethlehem.

LIMNAEIDÆ.

Limnaea catascopium Say. Monocasy Creek, unusually large specimens taken, measuring, length 26, diam. 15 mill.
Limnaea desidiosa Say. Monocasy Creek.
Planorbis bicarinatus Say. Lehigh and Delaware Rivers, common.
Planorbis campanulatus Say. Lehigh River, not common.
Planorbis deflectus Say. Canal and pond, Bethlehem.

ANCYLIDÆ.

Ancylus rivularis Say. Delaware River, Easton, Pa.

PHYSIDÆ.

Physa heterostropha Say. All streams.
Physa ancillaria Say. Monocasy Creek.

VALVATIDÆ.

Valvata tricarinata Say. Monocasy Creek, common.
Valvata bicarinata Lea. Pond, Bethlehem.

AMNICOLIDÆ.

Amnicola decisa Hald. Canal, Bethlehem.
Amnicola granum Say. Lehigh River.
Somatogyrus altilis Lea. Lehigh River.
Pomatiopsis lapidaria Say. Monocasy Creek, not common.

VIVIPARIDÆ.

Campeloma decisum Say. Lehigh River and Monocasy Creek common.
Lioplax subcarinata Say. With the preceding species, common.

PLEUROCERIDÆ.

Goniobasis virginica Gmel. Shells badly eroded in the Lehigh River, but perfect and large among rocks at the mouth of Monocasy Creek.

SPHÆRIIDÆ.

Sphærium simile Say. Mouth of Monocasy Creek, common.

Sphærium striatinum Lam. Saucon Creek (W. L. King).

Pisidium virginicum Gmel. Lehigh River, Delaware River (King).

Pisidium compressum Prime. Lehigh River.

UNIONIDÆ.

Unio complanatus Sol. Lehigh and Delaware Rivers, common.

Unio ochraceus Say. Delaware River, common.

Margaritana marginata Say. Delaware River, common.

Anodonta fluviatilis Lea. Lehigh Canal; also ponds in the vicinity of Bethlehem.

NEW FLORIDA UNIO.

BY L. S. FRIERSON.

No very clear idea of the *Unio coruscus* could exist because it has never been figured. Through the courtesy of Mr. Van Name, of the State Museum of New York, an accurate photograph of the type shell is herewith given to readers of the NAUTILUS (Plate I, figs. 1, 2, 3).

Mr. Van Name having also kindly compared suites of Florida *Uniones* with Gould's shells (three in number), an undescribed shell has been found which is herewith described.

UNIO TENUISCULUS n. sp. Plate I, figs. 4, 5, 6.

Shell transversely elliptical, rather solid, quite small, being the smallest member of the great *buckleyi* group yet published; smooth, eradiate (except when quite young), brown-olive, shining on the sides, the posterior area rough and dull; dorsal and basal margins nearly parallel (the former a little arched in some examples). Posterior point low and widely biangulate; truncate in front. Nacre purple and salmon-colored. Teeth double in left, single in right valve, quite stout. Length $36\frac{1}{2}$, alt. 20, diam. $14\frac{1}{2}$ mm.

The shell is differentiated from *U. coruscus* by being smaller; by its parallel outline; by its posterior point being lower and more biangular. In proportion to size, it is heavier in texture, and when perfect shells of both are compared, it is *not so shining* as is *coruscus*. The squarely built anterior end is a character common to a number of Florida *Uniones*.

The habitat is Reedy Lake, Polk Co., Florida, in the Gulf drainage. Specimens in cabinets of Mr. Bryant Walker, of the Academy of Natural Sciences of Philadelphia, and in my own.

A plate illustrating the type of *U. coruscus* Gld. and this species will appear in the next number.

NOTE ON THAIS (PURPURA).

BY MRS. M. BURTON WILLIAMSON.

Having recently received a fine series of American *Thais* or *Purpura* from Mr. Henry Hemphill, the well-known student of variation in shells, it occurred to me that his notes on these shells would be of interest to the readers of the NAUTILUS. The shells, compr'sing over fifty varieties of form, sculpturing, color, etc., were collected by Mr. Hemphill on the coast of Maine, Puget Sound, Washington, Oregon and California.

As the earlier readers of the NAUTILUS are aware, Mr. Hemphill takes one species as the type of a group, and around this type he places other species as types of varieties.

Many years ago P. P. Carpenter and George W. Tryon[1] noted the strong resemblance between *Purpura lapillus* L. of the eastern coast of North America, and *P. saxicola* Val. of the Pacific shore. Mr. Hemphill, while agreeing with them, would group our west coast species around *P. lapillus* L. as the progenitor of the whole series. He compares shells he collected on the coast of Maine with *P. saxicola* of the west coast, and a tray of these shells are, as he says, "almost identical in every respect with Tomales Bay, California, specimens." These selected specimens are puzzling indeed when we consider the geographical area from which they were collected.

[1] Manual of Conchology, Vol. II.

Mr. Hemphill's conclusions, as shown in the study collection received from him, would be, in the grouping of the west coast *Thais*, as follows: *Purpura lapillus* L.; var. *ostrina* Gld., *P.* var. *emarginata* Desh., *P.* var. *saxicola* Val., *P.* var. *lima* Mart., *P.* var. *septentrionalis* Rve., and *P.* var. *crispata* Rve. Variations, globose, banded, etc., and color-variations very naturally are grouped under each named variety, and present a series of variations typical of the painstaking that has always been accorded this veteran conchologist of the Californian coast.

FURTHER NOTES ON ASIATIC VIVIPARAS IN CALIFORNIA.

BY HAROLD HANNIBAL.

In THE NAUTILUS, V, 1892, p. 114 and VI, 1892, p. 51, W. M. Wood reported *Paludina japonica* from the Chinese markets of San Francisco. The writer has had an opportunity to examine some of these specimens in the collection of W. S. Raymond, and they prove to be *Viviparus malleatus* Rve., having been compared with *malleatus* received under that name from Frederick Stearns at a time when the Japanese Viviparas were was less known than at present. Stearns (NAUTILUS, XV, 1901, p. 91) reported *V. stelmaphora* (= *malleatus*) sent by Mrs. A. E. Bush, a shell enthusiast now dead, "from seven or eight miles from San José" (probably in the Artesian Belt), and "a little valley at the foot of Mount Hamilton." The latter locality is probably erroneous; it has not been verified, and the specimens seem to have passed through several hands. In 1908, the writer (NAUTILUS, XXII, p. 33) noted *V. lecythoides* from the Artesian Belt between San José and San Francisco Bay. Comparison with specimens from Nagasaki, Japan, proves this also to be *malleatus*, and it is figured under that name in the 1910 edition of West American Shells, Pl. iii, fig. 8.

It is abundant at a number of points in the Artesian Belt since this was at one time an extensive berry district where celestials were employed. The species was brought from Yokohama and originally planted between Alameda and Centerville to supply the markets about San Francisco Bay where they bring 20 cents a dozen according to Wong, a Chinese merchant, whence colonies have been dis-

tributed to a number of points in the Sacramento-San-Joaquin Valley as well. This is verified by specimens from an irrigating ditch near Fresno received from C. E. Jenney. It may be expected to turn up elsewhere.

A few days ago on a visit to the Coalinga Oil Fields a lengthy wait at Hanford was necessary to make train connections. While other passengers sat about with bored expressions or searched the town for amusements, the writer welcomed it as an opportunity to go forth in search of the elusive snail and walked out of town about half a mile east to a dry irrigating ditch. This had recently been prolific of molluscan life, and while scratching in the dried weeds for *Pisidia* a specimen of another *Vivipara* was found. *Pisidia* were forgotten and a systematic "muckraking" of every weed up and down the ditch for a hundred yards was only interrupted by the roar of the coming train. The spoils proved to be *Vivipara japonica* Mart., a number of which were still alive, though the ditch from all evidences had been dry for months.

V. japonica may be readily distinguished from *malleatus* by its sharper more acute spire, flatter whorls and fine spiral striae instead of the four lines of revolving punctures. The carinate base is usually retained throughout life while in all introduced *malleatus* seen it becomes obsolete before maturity is reached.

The Japanese, who are also fond of these, call them Tanisha or rice snails.

Pilsbry and Johnson (NAUTILUS, VII, 1894, p. 144) note that Taylor reports *Paludina japonica* (= *Vivipara*) from the Chinese markets of Victoria, B. C.

NEW JAPANESE NATICIDAE AND SCALARIIDAE.

BY HENRY A. PILSBRY.

Polinices pila, n. sp.

The shell is umbilicate, globular, with a short, conic spire; brown with lighter streaks, and partially covered with a very thin cuticle, worn from the back, which is somewhat flesh-colored. The surface is smooth except for fine, faint growth-lines which are strongly re-

tractive below the suture, and very faint, fine spiral striæ. Whorls $5\frac{1}{2}$, the earlier ones worn, blue, scarcely convex, the last 2 or $2\frac{1}{2}$ flattened below the suture, then convex; last whorl is somewhat concave below the suture, elsewhere well rounded. The aperture is only slightly oblique, half-circular, brown inside, with a white band within the acute lip, which is built forward near the upper insertion. The columella is white, rather thick, with a very weak, low lobe partially filling the umbilicus, above which a lobe projects angularly forward and is appressed to the shell wall. The parietal wall is almost nude in the middle but has a heavy white callus in and below the posterior angle of the aperture. The umbilicus is narrow.

Alt. 41.5, diam. 35.5 mm.

The operculum is thin, rich chestnut colored, somewhat concave outside in dry specimens, with the nucleus near the columellar margin, as usual. It seems to comprise about $2\frac{1}{2}$ whorls.

Akkeshi, Kushiro. Cotypes no. 97973 A. N. S. P., and no. 1706 of Mr. Hirase's collection.

This form belongs to the subgenus *Lunatia*. It differs from the young stage of *P. lewisii* by the shape and uniform whiteness of the columellar callus (*pila*, a ball).

Polinices bathyraphe n. sp.

The shell is small, openly umbilicate, globose, white under a thin light yellow cuticle. The spire is very short and low, the early whorls white and worn. The suture is deeply impressed, and in the last whorl conspicuously channelled. The surface is shining, marked with fine growth-lines and minute spiral striæ, which are strongest around the umbilicus. There are $3\frac{1}{2}$ convex whorls, the last very large, flattened and depressed at the suture, elsewhere convex. The umbilicus is large and open. Aperture very oblique, half round, white within. Outer and basal lips are thin and sharp. Columella concave, obtuse and simple below, but above, in the umbilical region, it dilates, forming a small, slightly thickened lobe, to some extent arching over the umbilicus, and adnate above. The parietal wall is very short, white, and heavily calloused throughout.

Length 6, diam. 6.5 mm.; longest axis of the aperture 5.3 mm.

Fukura, Awaji, Cotypes no 97974 A. N. S. P., and no 1676 of Mr. Hirase's collection.

A miniature *Polinices*, resembling *P. montagui* Forbes and *P. pallida* B. & S., but very distinct by its conspicuously excavated suture (*bathyraphe*, deep suture.)

SCALA STIGMATICA n. sp.

Allied to *S. maculosa* Adams & Reeve. The shell is barely rimate, white, marked below the perifery with oblique oval brown spots in each inter-lamellar space, and sometimes with a few faint ones above the perifery. These spots are not sharply defined, but fade at their edges. The spire is straightly conic; embryonic whorl or whorls wanting in the specimens seen. Succeeding whorls are well rounded, separated by deep sutures. The last one or one and a half whorls are so deeply separated that they seem to be in contact only at the ribs. There is a very minute sculpture of fine, close, unequal engraved spiral lines in the intercostal spaces. The ribs are rather low and narrow, without points at the shoulder, or with them very indistinct; at irregular intervals there are larger, heavier ribs. Each of the last two whorls has eight ribs. The aperture is oblique, short-oval; peristome continuous, with a strong lip-varix.

Length 24, diam. $8\frac{1}{2}$ mm.; whorls remaining $9\frac{1}{4}$.

Length $20\frac{1}{2}$, diam. $8\frac{1}{2}$ mm.; whorls remaining 10.

Fukura, Awaji, Japan. Cotypes no. 88318 coll. Acad. Nat. Sci. Phila., from no. 1571 of Mr. Hirase's collection.

This species was determined as new in 1904, and was sent out under the above name by Mr. Hirase. Subsequently I thought it might be a form of *S. maculosa* A. and R., and the description was therefore withheld. Mr. G. B. Sowerby, who received specimens from Mr. Hirase, has kindly informed me that it is quite distinct. *S. stigmatica* is "much larger than *S. maculosa*, whorls more rounded, ribs more distant, and not at all angular or aculeated" at the shoulder.

(*To be continued.*)

LAND SHELLS OF ATLANTIC CITY, NEW JERSEY

BY H. A. PILSBRY.

During August, 1909 and May, 1910, the writer spent two or three afternoons exploring certain small groves or copses standing in

the midst of the salt marshes which separate the coast islands from the mainland of New Jersey. Those visited lie perhaps a half mile out on the salt marsh from the inside or north shore of Ventner, a suburb of Atlantic City. They are elevated a few feet above the level of the surrounding marsh, and support a varied association of plants. In one place a single large holly tree stands in a thicket of low shrubs, poison ivy, etc., the whole only a few rods in extent. Here were found

Polygyra albolabris maritima (Pils.).
Vallonia perspectiva (Sterki).
Helicodiscus parallelus (Say).
Zonitoides arborea (Say).
Zonitoides minuscula (Binn.).
Cochlicopa lubrica (Müll.).
Pupilla muscorum (L.).
Bifidaria contracta (Say).
Bifidaria pentodon (Say).
Vertigo milium (Gld.).

This place, on a subsequent visit, was found deeply buried in sand, drifted from the surrounding area of made land, where it has been pumped out of the inlet.

Further eastward, and separated from the preceding by about half a mile of salt marsh, there is a narrow but rather long and sparse grove or copse of cedars, with dense underbrush of wild rose, poison ivy, sumac, grape, pokeberry, etc., etc. This is directly opposite Vassar Place, Ventner, and perhaps a half mile out in the marsh. Here were found:

Vallonia perspectiva (Sterki).
Zonitoides minuscula (Binn.).
Zonitoides arborea (Say).
Cochlicopa lubrica (Müll.).
Pupoides marginata (Say).
Pupilla muscorum (L.).
Bifidaria contracta (Say).
Bifidaria pentodon (Say).

In another place near by the same species were found with the addition of *Vertigo milium* Gld. and the shells of *Agriolimax*.

It is not easy to say how these snails reached such isolated spots, especially since few if any of them are to be found in the interior of New Jersey. The occurrence at sea level of such northern forms as *Pupilla muscorum* and *Cochlicopa* is anomalous. With them there is one distinctly southern species, *Vallonia perspectiva*, never before reported from New Jersey or any other point of the Atlantic coastal plain.

PUBLICATIONS RECEIVED.

Reports on Mollusks.—Two interesting reports on the mollusk fisheries of Massachusetts have been published during the past year by the Massachusetts Commission on Fisheries and Game. The reports represent a three-year investigation of the life, habits and methods of culture of the clam, quahaug, oyster and scallop. The work was done by Mr. David L. Belding, biologist. The subject is treated very thoroughly, with an account of their former natural abundance, historical wastefulness, present conditions and the possibilities of development. "Thousands of acres once productive lie barren, and we have but a remnant of the former abundant yield." Massachusetts fishermen to-day receive an annual income of $685,705 from the shell fisheries, which approximately cover a productive area of 40,000 acres. It is estimated that when the present vast areas are again made productive the value of the annual catch should be increased tenfold.

NOTES.

Chiton aureus Spalowsky, Prodromus in Systema Historicum Testaceorum (Wien, 1795), p. 88, pl. 13, figs. 6*a*, 6*b*, "Vaterland die Südsee (von der Insel Otaheiti?)" seems to be the common Magellanic *Plaxiphora setigera*, and is the oldest name for that species. It is described in a rare book, recently acquired by the Academy of Natural Sciences, and which I do not remember to have seen referred to in any other work. The figures are excellent in drawing and beautifully colored, much like those of Born. Most of them represent well-known species of Linnæus and Gmelin.—H. A. Pilsbry.

Note on Lampsilis discus (Lea.)—It may be worth while to record a *lapsus pennæ* in the reference to this species in Mr. Simpson's Synopsis of the Naiades, p. 705. Figure 310, plate LXII, of the Conchologia Iconica, of Sowerby, is there cited by Mr. Simpson under *L. discus* Lea. That figure really represents *U. crassidens* Lam., as noted by Simpson himself on page 707 of the Synopsis. The true *L. discus* Lea being shown in the Conchologia Iconica by a fine figure under the name of "*Unio mexicanus* Sowerby."—L. S. Frierson.

Figs. 1, 2, 3. Figs. 4, 5, 6.

1, 2, 3 UNIO CORUSCUS GOULD, TYPE, P. 29.
4, 5, 6. UNIO TENUISCULUS FRIERSON, COTYPES, P. 29.

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CORRESPONDENCE FROM BRAZIL.

BY FRED. BAKER.

Natal, Brazil, *May* 30, 1911.

As I have a chance to get letters away to-morrow, and as I have a little breathing spell this afternoon, I will give you an idea what we have been doing since reaching Brazil.

Unfortunately, we lost much time in Ceará waiting for the way steamer to bring us to this smaller port, and as the vessel was expected from day to day we did not unpack our outfit, so our work was not carefully done.

The authorities have been most considerate, admitting our things without duties, and in every way facilitating our work. At Ceará we were taken in a special train to Quixadá—164 kilometers—where the largest dam in Brazil is located. It is a surprise to all of our party who are new to the country to find that the States of Ceará and Rio Grande do Norte, making up the northeastern portion of Brazil, have a climate about as dry as that of Southern California and not very unlike it in many other respects. Nowhere did we see the luxuriant tropical vegetation which we were accustomed to in Mexico and Central America. The whole coast is a line of sand dunes, constantly shifting, varied by an underlying sand rock in places, and as far as we went the timber is all small.

The dam at Quixadá is an enormous affair, and owing to the scanty rainfall of the district and the limited watershed, which probably was never carefully estimated, it is much larger than is needed and has never entirely filled.

For two days we were the guests of the railroad and government officials and were royally treated. The train made frequent stops at stations and wherever there seemed any prospects of finding things zoological. Before we reached our destination we had scared the natives by our collection of lizards, toads and snakes, and I had been able to get a few specimens of land shells, to which I have been able to add extensively since. I am unable to determine anything with definiteness, but to date I have collected over a quart of living and dead shells apparently representing Helix, Zonites, Bulimus, Bulimulus, Buliminus, Tomigerus and Stenogyra. In Ceará the number of all except the last was very small, but back of Natal I have found the other genera represented in considerable numbers.

In Natal we were again the guests of the railroad and government officials for a run of 86 kilometers to Baixa Verde, located in the "Campos" country, the great rolling comparatively barren plains of the interior of the State. On the way we passed a single limestone cut furnishing a fine lot of fossils and also representatives of at least three species of living shells. The low, brushy timber through which we ran was largely made up of the Mangabeira, the rubber tree of Southeastern and Eastern Brazil, which at a distance reminds one of a small weeping willow. This, in season, furnishes employment for a considerable number of men, and yields sufficient rubber to show considerable export. For the rest, Cactus, Acacia and similar growths take one back in imagination to the lower parts of Arizona and New Mexico.

Later we were furnished a custom-house steamer for a run of 20 miles down the coast to the little town of Piraugy. Here we dropped into a typical tropical settlement, very primitive and poor, but most interesting. This region is noted for its native pillow lace, and here it was for sale very cheap, so that most of our party invested small sums. We estimated the time spent in making some of it and found the women selling the results of their labor for from two to four cents a day.

I interested the native boys in collecting, and on the shore rocks we got at least one species of Chiton, a small Arca like *solidissima* and a small variety of things not yet determined. On a reef about a mile out I added a few things, but my impression formed here and at Ceará is that the conchological fauna is extremely poor both in number of species and of specimens. I spent an hour dredging at

the boat's anchorage in two fathoms of water and had much difficulty in getting the material aboard as the sand was almost too fine to stay in the dredge net. The material is not rich, but a large handful looked over yesterday yielded a Dentalium, a Turbonilla, and three or four minute Rissoids.

At Ceará I found *Neritina virginea* very common and all along the coast a Cryptogramma is in evidence. Also two species of the Lucinidae, one measuring about two inches across are not rare, as well as several representatives of the Tellinidae, always beach-worn. A day's very careful dredging over some nine miles of the estuary on the side of which Natal is located, ranging from the muddy mangrove swamps above to the shifting sands at the mouth gave very little results, so that I am disappointed in the hope of securing a large collection while here. However, as we shall stay a month longer, I hope to be able to make a useful and fairly full report of what is here. There is a company about to begin work with a couple of deep-sea trawlers, and we have been invited to make ourselves at home aboard as soon as they get to work. This should give me a chance to see just what the bottom offers about this region.

Our original plan to work the coast from this point to Pará has been upset because the only available government boat is too small to carry the necessary supply of coal and water to make the long run between ports where coal can be had, and the owner of the only available sailing vessel demands $3000.00 to take us to Pará, although the trip could be made in a month or six weeks. On this account, and because of the great possibilities which the trawlers offer, we have decided to make a careful survey of this region before moving up the coast.

You asked me to write you of our trip for use in the NAUTILUS. If any of the foregoing seems of sufficient interest for such use you are welcome to use it. As you will see, our plans have been largely changed, but it is the verdict of all concerned that a thorough survey of this region, which has never been worked at all, may yield as valuable results as anything we could do. We have passes over the two railroads, and everything points to efficient work.

Meanwhile we are beautifully located on a hill overlooking bay and ocean; there is a constant breeze from the ocean, and there is no appreciable heat unless one exerts oneself; so we are in for a delightful time, whatever our results may be.

ARKANSAS SHELL COLLECTING.

BY F. A. SAMPSON.

In March of the present year I did some collecting at three places in Arkansas, and below I give the result. The first place was at Van Buren, Crawford county, on the bluff above the town. Here I found only four species.

Bulimulus dealbatus (Say). Two shells were found, both dead ones.

Polygyra appressa (Say). Two dead shells of 17 and 18 mm. There was scarcely an indication of the lamella-like long denticle on the basal margin that is mentioned in the type description.

Polygyra inflecta (Say). One-third of the fifteen shells did not have the umbilicus entirely covered. They were of five whorls and 9 to 10 mm.

Polygyra jacksoni (Bland). At Eureka Springs, Arkansas, this species is of five and one-half whorls, and 6 to 6½ mm.

From various other counties of the State the size is about the same, but from Sebastian county they were larger. The most of those found here, seventy in number, were of 8 mm. and were of decidedly darker color than those from other localities. The same was true of the *inflecta*, but not as notably so. Shells were generally scarce under large single stones, and were found under piles of stones.

II. The next locality was at Winslow, at the north end of the tunnel at the top of the Boston Mountains. The first day I collected on both sides of the valley and gathered a considerable number, including perhaps fifteen *Polygyra edentata*, but by a misunderstanding they were all thrown in the fire. The next day I went over almost the same ground and got the following:

	East side.	West side.
Polygyra perspectiva,	1	15
P. labrosa,	40	77
P. dorfeuillana sampsoni,	5	15
P. edentata,	8	5
P. jacksoni,	15	90
P. neglecta,		20
P. albolabris alleni,		4
P. thyroides,		5
Omphalina fuliginosa ozarkensis,		5

The *alleni* were 24 and 25 mm. in diam., and the larger one of the *thyroides* 20 mm., the others 18 mm. and of less than five whorls. It will be noticed that no *inflecta* were found here.

III. The third locality was two miles north of Brentwood, the first station north of Winslow, at a place on the railroad called by the country people "acorn cut," from the fossil pentremites found there. In the woods near the railroad I got:

P. albolabris alleni, 1 specimen; *P. thyroides*, 2; *P. clausa*, 3; *P. appressa*, 4; *P. neglecta*, 2; *P. edentata*, 6; *P. labrosa*, 4; *P. perspectiva*, 5.

These were all found close to the valley, while at Winslow they were found only high up on the mountain.

Columbia, Missouri.

NEW JAPANESE SCALARIIDAE.

BY HENRY A. PILSBRY.

(*Concluded.*)

Scala kamakurana, n. sp.

Related to *S. turricula* Sowerby. The shell is imperforate, pure white. The spire is straightly conic. First three whorls form a smooth, embryonic shell. Following whorls sculptured with ribs and spiral striæ are well rounded, with deep sutures. The spirals are cord-like, about as wide as their intervals; on the penultimate whorl there are eight. They are wanting on the upper third of each whorl, which is almost smooth. About twelve spiral cords can be counted on the last whorl. The vertical ribs are mostly rather narrow and delicate, slightly recurved, but there are from one to three stronger ribs on each of the last two whorls. Each rib has an angle or a short point above quite near the suture. There are fifteen ribs on the last whorl of a shell 9 mm. long, and seventeen on a slightly larger shell 9.8 mm. long. The ribs are for the most part connected or continuous from whorl to whorl, but in some places they do not connect. Aperture short-oval; columellar margin of the peristome wider than the varix of the outer lip. Length 9, diam. 3.8 mm.; whorls 9.

Kamakura, Sagami. Types No. 70740, A. N. S. P., collected by F. Stearns.

Shorter and broader than the following species, with the shoulder-angles of the ribs nearer the suture.

Scala sagamiensis, n. sp.

This species is closely related to *S. kamakurana*, from which it differs in the following respects: The shell is more slender, sutures deeper. The spiral cords are somewhat stronger, eight or nine on the penultimate, thirteen on the last whorl, the intervals below the suture and above the spirals being smooth. Ribs rather narrow and delicate, with occasional higher ones interposed at irregular intervals. The smaller ribs are either unarmed or but weakly angular above, but the larger ones have distinct points above, further from the suture than in *S. kamakurana*. There are fifteen ribs on the last whorl. The aperture is very shortly-oval. Peristome continuous, the outer varix bearing a point above; columellar margin dilated at the base; parietal callus spreading forward.

Length 11, diam. 4 mm.; whorls remaining 8, the first one smooth, the apical whorls wanting.

Kamakura, Sagami. Type No. 104696, A. N. S. P., collected by F. Stearns.

NEW CUBAN UROCOPTIDAE I

BY PROFESSOR CARLOS DE LA TORRE.

The species described below were collected by the writer in the northeastern angle of Santa Clara Province, from Remedios to the Camaguay boundary, chiefly in the Sierras near the northern coast, which may be reached from the towns of Remedios, Yaguajay and Mayajigua.

Being *Gongylostomæ*, the species are of the west Cuban type, but they have a particular facies of their own. The prevalence of forms belonging to the section *Esochara* is an interesting feature of this fauna.

Illustrations of all the following species will accompany the concluding paper.

Urocoptis (Gongylostoma) villarensis, n. sp.

Shell rimate, swollen-cylindric, the upper third tapering to a nar-

row truncation ; rather thin ; streaked with white on a pale brown ground. Surface silky, closely subarcuate-striate; suture simple. Whorls 8-9 scarcely convex, the last shortly free in front with a cord-like keel around the base. Aperture slightly oblique, subcircular, slightly narrowed laterally, light brown within ; columellar fold visible deep within ; peristome nearly white, expanded and reflexed throughout, but narrow in the peripheral region. Axis encircled by two subequal compressed lamellæ, the lower denticulate in the upper whorls, and both rapidly enlarged in the antepenult and penultimate whorls, smaller in last whorl.

Long. 22, diam. 6.2, apert. 5 mm. Whorls 9.

Long. 19, diam. 6, apert. 4.8 mm. Whorls 8.

Long. 20, diam. 6, apert. 5. Whorls 8.5.

Central Cuba ; El Purio, near Calabazar de Sagua and El Capiro, near Santa Clara, Province of Santa Clara. A locality also called " Las Villas."

This species obviously belongs to the Subgenus *Gongylostoma*. It approaches *U. obliqua* but differs by its larger size, simple suture and by the wider lamellæ of the axis, etc.

Urocoptis (Gongylostoma) proteus, n. sp.

Shell rimate, cylindric, somewhat swollen, the upper third tapering to a rather narrow truncation ; thin ; brown, marbled with white flames ; surface obliquely rib-striate ; suture sub-crenulate. Whorls 9-11, a little convex, the last purplish, shortly free in front, with an obsolete basal keel. Aperture slightly oblique, subcircular, brown within ; peristome, columella and upper wall white ; peristome expanded and reflexed. Axis encircled by three compressed lamellæ, the lowest denticulate above the middle, moderately expanded in the three last whorls, the others disappearing in the penultimate whorl.

Long. 22, diam. 6, aperture 4.2 mm. Whorls 11.

Long. 17, diam. 5.2, aperture 3.2 mm. Whorls 9.

Long. 20, diam. 6, aperture 4 mm. Whorls 10.

Central Cuba, Sierra de Bamburanao near Seibabo de Yaguajay in the Province of Santa Clara.

Similar to *U. villarensis* but its whorls are more convex with riblets separated by wide intervals, suture subcrenulate and the axis encircled by three instead of two compressed lamellæ.

U. PROTEUS CASTANEA, n. var.

Differs from the type in being of uniform brown, with last whorl purplish. The suture is more distinctly crenulate.

Long. 18, diam. 5.5, ap. 3.3 mm. Whorls 9.

Long. 15, diam. 4.8, ap. 3.2 mm. Whorls 8.5.

Long. 16, diam. 5, ap. 3.3 mm. Whorls 9.

Central Cuba; Colonia Santa Cruz between Seibabo and Yaguajay in the province of Santa Clara.

Differs from *U. remediensis* by the somewhat swollen shell, rapidly tapering to a broader truncation, more solid, and chestnut-colored without whitish spots; rib striate and more crenulate, etc. The axial lamellæ are also somewhat differently disposed.

U. PROTEUS ROBUSTAXIS, n. var.

Shell smaller, cylindric, somewhat swollen, rapidly tapering to a very narrow truncation; somewhat solid; pale chestnut with obsolete whitish clouds; oblique, regularly rib striate; suture not crenulate. Whorls 9–10.5, a little convex, the last one more free. Aperture as in *U. proteus*, typical. Axis tri-lamellate, rather strong and stout in the last whorls.

Differs from the variety *castanea* by its simple suture, more projecting last whorl, stouter axis, and by its color pattern of a few white and chestnut spots on pale brown ground. The last whorl is purple, as in the type.

Long. 18, diam. 4.8, ap. 3.8 mm. Whorls 10.5.

Long. 17, diam. 5, ap. 4 mm. Whorls 9.

Long. 17, diam. 4.7, ap. 3.5 mm. Whorls 10.

Central Cuba; Sierra de Santa Rosa between Remedios and Seibabo de Yaguajay in the province of Santa Clara.

UROCOPTIS (GONGYLOSTOMA) REMEDIENSIS, n. sp.

Shell rimate, cylindric, the upper third (or half) tapering to the truncation; thin; brown with opaque whitish flames. Surface obliquely weakly striate; suture slightly crenulate. Whorls 8-10, a little convex, the last purplish, shortly free in front with a cord-like keel around the base. Aperture slightly oblique, ovate rounded; dark brown within, but the peristome, columella and upper wall nearly white. Peristome expanded and reflexed throughout. Axis encircled by three compressed lamellæ, the lower denticulate in the upper and median whorls.

Long. 16, diam. 4, aper. 3.3 mm. Whorls 9.5.
Long. 14, diam. 3.2, aper. 3 mm. Whorls 8.
Long. 15, diam. 4, aper. 3.2 mm. Whorls 9.
Var. *a*. Somewhat larger and swollen. Whorls 9–11.
Long. 20, diam. 5.2, aper. 4 mm. Whorls 11.
Var. *b*. Chestnut-brown, spotted with white above sutures.
Long. 18, diam. 5, aper. 3.6 mm. Whorls 10.

Central Cuba; Near Remedios; var. "*a*" from El Palenque de Jaguayabon and Cerro de Guajabana; var. "*b*" from near Jaguayabon, all in the Province of Santa Clara.

The complete shell has 17 to 18 whorls with a total length of 20 to 22 mm. The rejected or broken-off portion of the spire is attenuate, delicately striate and with a smooth translucent and bulbous tip.

UROCOPTIS (GONGYLOSTOMA) MAYAJIGUENSIS, n. sp.

Shell rimate, cylindric, the upper half tapering to a narrow truncation; thin; reddish chestnut profusely marbled with white, sometimes in zigzag pattern. Surface densely, obliquely striate; slightly angulate along the suture. Whorls 10 to 11, slightly convex, the last shortly free in front, with a basal, cord-like keel. Aperture slightly oblique, rounded-ovate, brown inside; peristome pale brown, expanded and reflexed. Axis encircled by two compressed lamellæ, the lower being larger in the later and slightly denticulate in the upper whorls.

Long. 23, diam. 5.2, apert. 4.2 mm. Whorls 12.
Long. 19, diam. 4.8, apert. 3.6 mm. Whorls 10.5.
Long. 20, diam. 5, apert. 4 mm. Whorls 11.
Var. "a." Smaller, more swollen, whorls almost flat.
Long. 18, diam. 5.2, apert. 4.2. Whorls 9.

Central Cuba; Las Llanadas, Sierra de Matahambre; var. "a" from Veredas de Aguada y del Alunado, in the district of Mayajigua, province of Santa Clara.

Differs from *U. villarensis* by its more slender and tapering spire, brown color, suture, number of whorls, etc., and from *U. remediensis* by its bi-lamellate internal axis, etc.

The opaque white pattern is confined to the striæ, the intervals being smooth.

U. MAYAJIGUENSIS FULVA, n. var.

Shell smaller, cylindric, more solid; light brown with a golden

gleam; striation coarser. Whorls 9 to 10, somewhat convex. Axis encircled by two compressed lamellæ, the lower more expanded than in the type.

Length 17, diam. 4.8, aperture, 3.5. Whorls 10.

Length 16, diam. 4, aperture 3.2. Whorls 9.

Length 16, diam. 4.5, aperture 3.5. Whorls 9.

Central Cuba; Coqueron del Jatibonico at the boundary between the Provinces of Santa Clara and Camaguay.

Some specimens show faint traces of white maculations.

Urocoptis (Gongylostoma) cioniscus, n. sp.

Shell rimate, cylindric, the upper fourth tapering to a rather wide truncation; somewhat solid; ashen with occasional brown streaks; sculptured with narrow oblique riblets separated by much wider intervals; suture simple. Whorls 9 to 11, somewhat convex, the last shortly free with an obsolete cord-like keel around the base. Aperture sub-circular, pale brown within, the peristome shining white, expanded and reflexed; columella with a distinct fold deep within. Axis bearing two lamellæ, the lower one somewhat the larger, denticulate above the middle and extending to the last whorl, the upper disappearing in the penultimate whorl.

Long. 26, diam. 5, apert. 5.2. Whorls 11.

Long. 24, diam. 5.2, apert. 5.3. Whorls 9.

Long. 25, diam. 5.2, apert. 5.3. Whorls 10.5.

Central Cuba; Cueva del Muerto, Sierra de Meneses in the district of Yaguajay, Province of Santa Clara.

Differs from *U. vignalensis* by its more cylindric and less tapering shell, the brown streaks, absence of granules along the sutures, and the axis encircled by two (not three) compressed and wider lamellæ. (Described from dead specimens).

Urocoptis (Gongylostoma) transitoria, n. sp.

Shell rimate, cylindric, the upper half or third tapering to a narrow truncation; thin; corneous-brown, with occasional stripes of a deeper brown irregularly spread. Surface lusterless, sculptured with narrow riblets separated by wider intervals. Whorls 9.5 to 11, a little convex, the last slightly darker and free in front, rounded below with an obsolete cord around the base. Aperture sub-circular, a little narrower above, brown within; columella, upper wall and

upper half of peristome white. Peristome well expanded and reflexed. Axis encircled by three lamellæ, the lowest denticulate above the penultimate whorl, moderately enlarged in the middle and extending to the last whorl. The upper lamella, compressed at first, becomes cord-like and disappears in the penultimate whorl; the intermediate lamella smallest and thread-like above.

Long. 24, diam. 5.8, apert. diam. 5.2 mm. Whorls 11.

Long. 20, diam. 5, apert. diam. 4.6 mm. Whorls 9.5.

Long. 22, diam. 5, apert. diam. 5 mm. Whorls 10.5.

Central Cuba; Sierra de Matahambre at Las Llanadas, in the district of Mayajigua, province of Santa Clara.

This species is intermediate between *U. cioniscus* and *U. fallax*, but is easily distinguished by its shape, color, and chiefly by the columellar axis.

Urocoptis (Gongylostoma) fallax, n. sp.

Shell rimate, cylindric, the upper third tapering to a rather wide truncation; thin; dull yellowish with occasional irregularly spaced brown streaks. Surface lusterless, sculptured with narrow arcuate riblets separated by much wider intervals. Whorls 9–11, convex, the last purplish brown, shortly free in front, rounded below, with an almost obsolete cord around the base. Aperture nearly round, brown within; peristome, upper wall and columella white. Peristome broadly expanded and reflexed. Axis stout and encircled by three sub-equal compressed lamellæ, the lowest largest in penultimate whorl and smallest in the upper whorls where the upper lamellæ dominate; lower lamella denticulate above.

Long. 25, diam. 6.2, apert. diam. 6. Whorls 11.

Long. 20, diam. 6, apert. diam. 5.6. Whorls 9.

Long. 23, diam. 6, apert. diam. 6. Whorls 10.5.

Central Cuba; Vereda de el Alunado, through the Sierra de Jatibonico in the district of Mayajigua, Prov. of Santa Clara.

Superficially resembling *U. intermedia* but differing chiefly in its more widely spaced riblets and in its axial structure. From *U. transitoria* it differs by its stouter form, sculpture and columellar axis.

Urocoptis (Gongylostoma) dilatata, n. sp.

Shell rimate, cylindric, slightly swollen, the upper third tapering

to the truncation; thin; grayish white, becoming slightly purplish brown on the last whorl. Surface lusterless, sculptured with narrow oblique riblets separated by much wider spaces; whorls 8–9, somewhat convex, the last rounded below with an obsolete cord around the base, very shortly free in front. Aperture large, subcircular or somewhat transversely oblong, a trifle brownish within, the peristome shining white, broadly expanded and reflexed; columella with a distinct fold. Axis encircled by two principal compressed lamellæ, the lower one largest, denticulate above the middle and extending to the last whorl, the upper disappearing to the penultimate whorl; in the median whorls a cord is sometimes interposed, particularly in the ante-penultimate whorl.

Long. 23, diam. 7, aperture diam. 7. Whorls 9.
Long. 20, diam. 6.5, aperture diam. 5.8. Whorls 8.
Long. 22, diam. 6.8, aperture diam. 6. Whorls 8.

Central Cuba; Sierra de Boquerón del Jatibonico at the boundary between Santa Clara and Camaguay Provinces.

The complete shell contains 16–18 whorls with a total length of 24–28 mm. The rejected portion is rib-striate with smooth and somewhat bulbous lip. Differs from *U. fallax* by its color, more enlarged aperture and by the columellar axis.

(*To be continued.*)

NOTES.

New Color Varieties of Helix (Dentellaria) badia Fér.—There is in my collection a series of *Helix badia* Fér., habitat unknown, which exhibit considerable variation from the type in their coloring. To call attention to their character I may be justified in giving names to these extreme forms.

As Dr. Pilsbry points out in the Manual (Vol. V, p. 86) the type of *badia* is "uniform dark chestnut colored." Between the typical form and the variety I first describe is a transition stage which is represented by an example before me.

Var. *roseolabrum*, n. var. Differs from the type in being much lighter in color and having a rose-colored peristome. Type in my own collection.

Var. *unicolor*, n. var. Distinguished by the light-colored shell and pure white peristome and teeth. In the example before me the umbilicus is not completely covered. Type in my own collection. This form should not be confused with Pilsbry's var. *guadeloupensis*. The latter is chestnut-colored and carinated at the periphery.

Maxwell Smith.

The Nautilus.

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AN INCIDENT IN CUBAN COLLECTING.

BY JOHN B. HENDERSON, JR.

In the course of a number of collecting trips to the Antilles for land shells I recall various instances of possibly more than average interest to those who know the delights of a field naturalist. Whenever some particular out-of-the-way locality was visited, often there would be some one species sought and desired above all others, generally a species of very local distribution, and which on account of rarity or beauty inspired us to greater efforts to find. So was it in the case of that splendid big and lusty *Pleurodonte gigantea* at La Ferrière in Haiti, and of *Pl. cognata* in a little valley in extreme western Jamaica. Cuba is full of such preferred and desirable game, but probably the special hunt for *Urocoptis elliotti* and its near ally, *U. dautzenbergiana*, proved to be the most strenuous of all similar experiences.

Mr. Charles T. Simpson was with me at the time in Havana, and we were planning for a dash somewhere into the interior when our excellent friend, Dr. Carlos de la Torre, a perfect encyclopedia of Cuban mollusks, suggested we try for that remarkable pair of Urocoptid twins that are reported to live on two mountains near Guane, and which had eluded all search since they were originally found by some fortunate collector many years ago. We lost no time in getting to Guane. Besides our special reason for going there, we well knew the region to be rich in that splendid fauna of the inner range of the Sierra de los Organos. There occur the lovely *Eutrochatella*

regina, the *parraiana* group of Helices, a host of Urocoptids, fine operculates and some peculiarly painted *Liguus*. Doctor Torre couldn't resist the temptation at the last second, so boarded the train with us. The doctor is always a most welcome and charming companion.

We located our mountains, which are in sight from Guane. One of them is the "Sierra de Guane," and somewhere upon its steep and precipitous sides we must look for *elliotti;* the other is called "Sierra de Paso Real de Guane," where presumably lived in security from prowling naturalists the strange *dautzenbergiana*.

Now we simply had to have those fellows. We prepared for their capture with the care and thought that mountain climbers give to their campaigns against loftier peaks. On horseback and by volanta we proceeded to the base of the Sierra and began our recognizance, but without a sign, not a "bone," of *elliotti*. There were, however, no end of other things, and the day was made glorious by a catch of great size and interest. It is a day that fairly shines in memory, and I have lived it over in retrospect with Simpson many times since.

The next morning bright and early we made our second attack. It was apparent that some climbing must be done. Far up on one side a great white limestone escarpment projects out from the mass of tropical vegetation covering the mountain, like the forehead of some great giant of the Sierra. It is perpendicular, forbidding and dangerous. Buzzards constantly circle about it, and it is likely to be the nesting-place of millions of fretful wasps; but just in such places live some of Cuba's very best molluscan offerings. I felt it must be attained, so up I "goes," scrambling, slipping, clinging to trees, crawling along limbs, only stopping now and then to catch a breath or to pick some appealing Liguus. Up until the blue Caribbean glistened on the horizon and the plains of Pinar del Rio lay stretched out like some huge map. At last the base of the cliff was attained, but no *elliotti* as yet. Through narrow crevasses I wriggled on up until finally, quite done for and exhausted, I lay for a while upon a little projecting rock-shelf to cool off and to speculate upon the folly of ever leaving a happy home, etc. Then, not suddenly, but gradually, I began to take in a remarkable sight. It required some moments to acquire what the psychologists call the "presentation" of the sight, but soon my heart began to thump and

my excitement to grow until I almost feared to trust myself alone upon such a height. All over the rocks, on the perpendicular cliffs, and exposed to the glare of a dazzling sun, were myriads of *U. elliotti*, clinging in their peculiar fashion to the surface, all alive and in finest condition of unbroken spires, and that color tone of health possessed only by fresh, living shells.

But now arose the problem as to how to gather them. It takes one hand to hold a box, another to pick specimens from their moorings, and it requires two more to hang on to the wall of smooth rock. Fortunately there was a breast pocket in my shirt, and with a twig I could keep it gaping open. Then with my lips I tenderly gathered them one by one, slowly and cautiously, and spat them into that happy pocket.

Had any telescope been trained upon me I would only have furnished one further evidence of hopeless mental condition, for indeed what sane man would spend an hour, or a moment as for that, fondly kissing a lofty cliff in Pinar del Rio?

If any reader of the NAUTILUS cares to take a chance on that telescope down below, and also the risk of a long fall, I can assure him that there are still a hundred thousand fine *U. elliotti* waiting for him right there on the Sierre de Guane.

REMARKS ON UNIO VARICOSUS, CICATRICOSUS AND UNIO COMPERTUS, NEW SPECIES.

BY L. S. FRIERSON.

A study of the shells generally known as either *Unio cicatricosus* Say or as *varicosus* Lea has brought to light a singular state of affairs. The *U. cicatricosus* was described by Say in manuscript, "together with about twenty others," in 1826, and published with such others as he supposed had not yet been described by other authors, in 1829. Taking, with his very incomplete description, the illuminating remarks following, we find that Say's species was a large, thick shell, with high beaks, but not so high as in the allied *Unio cordatus* (*obliquus* Lam.), and having a single row of transverse elevations down the center of the disc, and that it is "*a common inhabitant of the Wabash river.*" This is applicable to no known Unio except the *aesopus* of Green. This conclusion is fortified by the fact that

Conrad, who shortly after this time had become quite intimate with Say, so considered it in his "New Fresh-water Shells," published in 1834. So did Dr. Lea, but the opinion of the latter was discounted by conchologists because of the well-known enmity which unfortunately had sprung up between Say and Lea. Say himself placed Lea's *Unio varicosus* as a synonym of his *Unio cicatricosus*, in the short and exceedingly erroneous Synopsis of 1834. This dictum of Say has been accepted by nearly all conchologists since, but Say had never seen Lea's species, and his idea no doubt arose from Lea having *compared his varicosus with the aesopus* of Green. Say having shortly afterwards died, this dictum was never corrected by him.

It is true that Green had in 1827 published his *Unio aesopus;* but Say tells us that he had to forego at this time (1829) a design of compiling a synopsis of the western Uniones, *because of the impossibility of procuring books, etc.*, in his insulated abode, and Dr. Green's article, which was published in a rather obscure publication, no doubt had escaped his notice. At any rate the assignment of the Wabash as a common habitat of the *cicatricosus* effectually bars his shell from being the same as Lea's species, as the *varicosus* does not live in that river. Say's name then, being a synonym of *aesopus*, cannot be used for Lea's shell. Lea's name, as he tells us himself, had already been used by Lamarck; consequently his shell has no name.

Turning now to the shells themselves, we find equally as much confusion. There are no less than *four distinct species* so called to be found in our various museums and collections. Lea himself did not know his own shell very well, since, I am told by Dr. Dall, specimens of genuine *varicosus* were labeled by him as *subrotundus*, while on the other hand we are informed by Dr. A. E. Ortmann that a shell labeled *cicatricosus*, from the Beaver river, Pa., in the Academy of Natural Sciences, is in reality only an old *Unio subrotundus*. In the Conchologia Iconica of Reeve we are given two plates of this species (figs. 31 and 50) which evidently represent two different shells. Plates and names, therefore, will be given that students may recognize the sundry shells which at present go under the common names under discussion.

Unio detectus, new name. Plate II, lower, pl. III, upper figures.

This is the true *varicosus* of Lea, whose type shell is not *typical*

of the species (i. e., is not an average specimen). The best figure of this shell, though itself poor, is that given by Küster (Taf. 58, fig. 2). In its general facies the shell somewhat resembles the *Unio pyramidatus*, with the addition of the characteristic elevations. Mr. Swainson mentioned that he had seen a specimen of *mytiloides* with pustules down the center. There can be no doubt that he had a shell of this species before him. The specimen figured was given me by Dr. Dall, and came from the collection of the National Museum. It measures, length 87, alt. 70, diam. 39½ mm.

Unio cicatricoides, new name. Pl. II, upper figure.

This is the shell figured and described by Conrad in his Monography (page 115, plate 64), and also by R. E. Call, Indiana Mollusca (Indiana Geological Report, 1900), plate 55, to which description and plate reference is herewith made. Its general facies is much more like *aesopus* than *detectus*, from which latter it differs in being more inflated (especially behind) and is a larger shell; its lateral teeth are much more club-shaped and larger; the posterior sinus of the hinge margin is nearer the end of the ligament; the color of the epidermis is also different from that of *detectus*. Length 93, alt. 69, diam. 55½ mm.

Unio compertus, new species. Pl. III, middle and lower figs.

Shell medium in size; length 2.3, height 2.1, diameter 1.3 inches. Apparently dimorphic, the females (?) being broader behind than the males and more rounded, the males (?) being somewhat triangular and pointed behind, beaks high and well forward (their sculpture not seen). Epidermis dirty yellow, darker before (as in *circulus*). Basal outline rounded, and in the females expanded in the middle; shell not very much inflated. The posterior ridge is rounded, and becomes more and more inflated with age. The posterior area is narrow, with several more or less well-defined lines from beak to margin. Down the center of the disc runs a row of pustules, larger in the females, as well as more numerous. Inside, the nacre is white, quite thick in front, as far back as the center, or row of pustules, from thence it becomes remarkably thin in comparison, producing a trough-like excavation from beak to posterior base. Teeth erect and fairly stout; two cardinals and two laterals in the left valve and one each in the right.

Habitat: Clinch and Holston rivers.

The examples figured had been labeled *Unio cicatricosus* by Dr. James Lewis, and his determination had been O. K.'d by Mr. C. T. Simpson. Shells the same as these have been loaned the writer by Mr. W. A. Marsh under the same name (i. e., *varicosus*). Others of the same species had been given the writer by Mr. Bryant Walker as being the *varicosus* of Lea. With their attention called more carefully to the shell, however, both of these gentlemen now concur with me as to their novelty. Type in my collection. This shell is remotely, if at all, related to the other shells above mentioned. There is apparently a slight relationship to *Unio propinquus* in its general facies, but the species is in reality very distinct.

NOTE.—The term *Unio* is used above in the old broad sense of denoting a naiad shell having both lateral and cardinal teeth, and not in the restricted sense now held by our modern conchologists, and so embraces the various divisions of Quadrula, Pleurobema, Plethobasis, etc., etc., as the future study of the soft parts may incline the future systematists to place them.

CORRESPONDENCE FROM BRAZIL.

BY FRED. BAKER.

S. S. RHAETIA, HAMBURG-AMERICA LINE,
ON THE RIO NEGRO, 950 MILES FROM THE MOUTH
OF THE AMAZON, *July* 24, 1911.

Dear Dr. Pilsbry:

This goes in compliance with my promise to report of our progress. We left Natal, in the State of Rio Grande do Norte, on July 1st for Pará, after a stay that was comparatively barren of results zoologically. The reptilian collection is good, but in all other lines the number of species is small. My collection of marine shells—notwithstanding several days spent in dredging—is small enough, so that I feel sure that they are not to be found on this immediate coast, for reasons that we can only guess at at present. By interesting the ubiquitous small boy in a couple of interior towns I was able to secure several thousand land and fresh-water shells of a rather limited number of species. I feel reasonably sure that I have two new species

1. UNIO CICATRICOIDES FRIERSON.
2. UNIO DETECTUS FRIERSON.

1. UNIO DETECTUS FRIERSON.
2, 3, 4. UNIO COMPERTUS FRIERSON.

of *Tomigerus*, but the other things, unless it be in *Pisidium* and *Planorbis*, seem likely to prove well known.

On the way up the coast to Pará two of us decided that it would be a shame to visit Brazil and not go up the Amazon, so after seeing the rest of the party off for New York we got aboard this ship for a run at least as far up as Manaos, on the Rio Negro, 1004 miles from the Amazonian mouths. Our experience would be a surprise to Bates and Wallace, or even to Agassiz. Manaos is the real center of the great trade in so-called Para rubber, and in these later days great ships clear direct for this port from New York and various European countries. So we were able to take passage for a thousand miles in this transatlantic liner of 6600 tons, furnishing magnificent accommodations and service, and we are just finishing the run against the powerful current of the rivers in less than three and a half days. We shall get in this evening, but shall not be allowed to land till the morning.

Our further plans are a trifle in the air, but we are going to try for passes up the Madeira river for some six hundred miles to the works of the Madeira & Mamoré R. R. Co. Here the government is building some two hundred miles of railroad at enormous expense around the falls and rapids of the Madeira river to tap another thousand miles of navigable river running into the heart of the rubber country forming the angle of Bolivia and Peru. The enterprise is largely in the hands of American and English engineers and physicians, and we are assured of a warm welcome and much help in collecting if the powers that be decide to send us up.

I believe that no land or fresh-water shells have gone out from this Madeira country, so that I feel sure of getting material of much value if I get any. Likewise my companion, the entomologist, knows of nothing in his line that the country has furnished except some butterfiies, so we are both extremely anxious to get in. If we succeed we shall have at least a month on the ground for actual collecting.

Meanwhile we have had a most glorious sail up the Amazon till a couple of hours ago, when we entered the Rio Negro. To avoid the heavy current the ship has hugged the sides of the river, often within a hundred feet, giving us a splendid chance to observe animal and vegetable life at a reasonable range for field-glasses. Animal life has not been plentiful, but it has been interesting. The harpy eagle, parrots, toucans, kingfishers, terns and three species of heron have

been the most striking birds, with many that we could not place at all. An occasional alligator or crocodile can be seen, but we are surprised at the scarcity of this beast. During every minute of daylight there has been something beautiful and interesting to look at, and the cool nights are as delightful as the days, which are not excessively warm. We are impressed with the fact that few people realize that the round trip can be made from New York to Manaos for $160, with stops of several days at Pará and Manaos, in really fine vessels. Otherwise it seems probable that many people would take the run. The ship's surgeon is a noted German professor, who takes this method of getting a splendid vacation.

P. S. Manaos, July 25, 1911. Have just landed and got settled. We learn that we shall be delayed a week waiting the return of the Madeira & Mamoré Co.'s steamer and manager, but we are assured that we shall be sent up to the Madeira river, as we had hoped, free of cost for the trip and living expenses while there. Also we are told that there are land shells about Manaos, so the time will not hang heavily on our hands.

A NEW VARIETAL FORM OF SCALA PRETIOSA LINN.

BY MAXWELL SMITH.

SCALA PRETIOSA (Linn.), n. var. MULTIVARICIFERA.

This form differs from the type in the broader shell and greater number of varices. Comparing an average shell with the variety, the number of varices is as follows:

Typical form.	*Var. multivaricifera.*
Embryonic whorl,	Embryonic whorl,
Embryonic whorl (?),	Embryonic whorl (?),
Third whorl, 8 varices,	Third whorl, 8 varices,
Fourth whorl, 8 varices,	Fourth whorl, 8 varices,
Fifth whorl, 8 varices,	Fifth whorl, 8 varices,
Sixth whorl, 8 varices,	Sixth whorl, 9 varices,
Seventh whorl, 8 varices,	Seventh whorl, 11 varices,
Body whorl, 10 varices.	Body whorl, 15 varices.

Around a portion of the body and upper whorl of the variety

before me there is an impressed longitudinal line which interrupts 12 of the varices. When older the animal corrected this irregularity. This line will probably be found absent in other individuals.

It seems remarkable that so striking a shell as this form has heretofore escaped notice. The habitat of the type, which is in the writer's collection, is supposedly China.

NOTE ON THE DISTRIBUTION OF MARGARITANA MONODONTA SAY.

BY BRYANT WALKER.

In commenting, recentiy, on the distribution of this species (Proc. Mal. Soc., IX, pp. 137–139, 1910), I stated that although it had not been cited from the Ohio east of Cincinnati nor from the tributaries of the Tennessee above Knoxville, in the absence of any records of its occurrence west of the Mississippi, south of Iowa, nor in that river below Adams County, Ills., "the inference would be that its original point of dispersal was in the east, and that it had migrated westward by two routes, one down the Ohio and thence into the Mississippi Valley, and the other down the Tennessee from its tributaries or head-waters. That it reached its present range by a migration from the southwest is, in view of the known facts of its present distribution, quite improbable."

Since the above was written some additional data of considerable interest have been received.

In the fall of 1910, acting under the instructions of the U. S. Fish Commission, Mr. A. H. Boepple explored the Cumberland River from Pineville, Ky., to Celina, Tenn. In his progress down the river he found *M. monodonta* at the Sloan Shoals near Burnside, between Eads' Landing and Rowena, and at Cloyd's Landing.

I have also recently received the species from three localities in the Clinch River, Tenn., viz., near Needham's Ford and between Kelly and Sharp's Ford, Union County, and between Agee and Offut, Anderson County.

These records definitely determine the occurrence of the species in all of the principal rivers that unite to form the Tennessee, excepting the Powell and the French Broad, and its presence in the Clinch makes it reasonably certain that it will also be found in the former. The head-waters of the latter rise in another, quite differ-

ent region, and it may not be found in it at all, except, perhaps, near its junction with the Holston.

The presence of the species in the Cumberland offers a possible explanation for its occurrence in the Ohio below Cincinnati and in the Wabash. But that, of course, can not be definitely determined until all of the southern tributaries of the Ohio, which head in the mountains of West Virginia, have been carefully explored. If the species should be found in the Big Sandy or the Great Kanawha, for instance, it would seem likely that it reached the Ohio from that source, even though, at the present time, it is not found in that river above Cincinnati.

But, however that may be, these new records tend to confirm the opinion that the original point of dispersal of the species was in the head-waters of the Tennessee system and that its present distribution is "rather the result of an ancient migration from the northeast than one from the southwest."

LAND MOLLUSCA AT TOLLAND, COLORADO.

BY T. D. A. COCKERELL.

On August 23 and 24 my wife and I collected snails at Tolland, in Gilpin county, Colorado, at an altitude of 8900 to 9000 feet. The list of species, though short, may be of interest on account of the high altitude, and the addition of one species to the Colorado list.

Agriolimax campestris montanus (Ingersoll). Variable, some very dark.

Vitrina alaskana Dall. Abundant.

Euconulus fulvus alaskensis Pilsbry, abundant.

Vitrea radiatula electrina var. *alba* (Jeffreys) Taylor. One.

Zonitoides arboreus (Say). Common under *Populus tremuloides.*

Punctum pygmæum minutissimum (Lea). My wife found two by carefully searching over dead leaves from the *Populus tremuloides* zone. I believe only one specimen of this species has previously been found in Colorado. Taylor (Monog. L. & F. W. Moll. Brit Is.) cites Willow Creek and Cloudcroft, but the latter locality is in New Mexico.

Sphyradium edentulum alticola (Ingersoll) The adult is over

$2\frac{1}{2}$ mm. long, and is to be compared with the European variety *columella* (Von Mart.) or *gredleri* (Clessin).

Vallonia cyclophorella Ancey. Abundant.

Pyramidula cronkhitei anthonyi Pilsbry. Not uncommon.

Cochlicopa lubrica (Müller). One.

Pupilla muscorum (L.). Several of the typical edentate form.

Pupilla blandi Morse. Common.

Pupilla syngenes dextroversa P. & V. New to Colorado. One shell, 4 mm. long, nearly 2 broad; whorls $7\frac{1}{2}$, the upper ones not swollen as in typical *P. syngenes.*

Vertigo modesta parietalis (Ancey). Common. Rather small for *parietalis,* but over 2 mm. long; palatal plicæ long, as in *concinnula;* shell clear chestnut; aperture strongly elbowed above. This is apparently a distinct race, between *parietalis* and *concinnula,* but hardly recognizable by a separate name. Ancey's name, *ingersolli,* certainly included such forms as this, and could be so restricted without much risk of error.

NOTES.

Note on Epiphragmophora infumata Gld.—In Mr. Edson's interesting paper on the Land Mollusca of San Mateo Point, California (on the western shore of San Francisco Bay), in the June Nautilus (Vol. xxv, p. 17), occurs a statement as to the habitat of *E. infumata* Gld. which needs correction. While he states the southern limit of this form as Santa Rosa, which is about 50 miles north of San Francisco, I have collected it for many years on the eastern side of San Francisco Bay, in Alameda county. In his Manual of American Land Shells (U. S. Nat. Mus. Bull., No. 28), Mr. Binney also mentions the Bay region and Alameda county as its home as far back as the year 1885. The shells found here are the extreme form of this species (or var. of *E. fidelis?*), being black, highly carinate, heavily hirsute, and bearing the scales mentioned by Dr. Gould in his description well marked, as distinguished from the specimens from Marin county and further north.

As to the typical *E. fidelis,* collected at San Mateo Point by Mr. Gifford, it seems clear that they were chance specimens or exotic. I might hazard an opinion that this form became introduced through the oyster traffic in which, years ago, the native Washington bivalve

was brought to our Bay in large quantities, or it may have been planted there.—Fred L. Button, Oakland, Cal., July 20, 1911.

Epiphragmophora fidelis.—I note in the Nautilus for June, 1911, that Mr. Harry Edson regards my record of *Epiphragmophora fidelis* from San Mateo Point, California, as erroneous. I would state that the specimens were *E. fidelis* without the slightest doubt Furthermore, I again collected living specimens in the same locality on August 14, 1910.—E. W. Gifford.

Lymnæa auricularia Linné in Canada.—On July 23, 1911, I found *Lymnæa auricularia* Linné inhabiting a chain of pools on the beach of Lake Erie at Kingsville, Ontario, about opposite Sandusky. Young individuals were fairly numerous, but the only mature shell seen was a dead one.—John A. Allen.

Locality for Polygyra (Triodopsis) obstricta Say.—Beyond Murphreesboro (Tennessee) there is a road turning square to the right from the main pike. About half or three-quarters of a mile out, on the right-hand side of the road, is the only good locality I ever found for *obstricta*. There they were typical, large, fine shells. They were found about dead logs and old stumps.—A. G. Wetherby, in letter, about 1898.

Limax maximus on Nantucket Island.—When recently at the town of Nantucket, Mass., I found *Limax maximus* well established. There were two varietal forms: (1) Mantle spotted, the spots partly confluent; body marbled and with four gray-brown bands, the two inner with blackish spots. (2) Mantle marbled; body gray with three light bands, the inner rather dark edged. I also found *Agriolimax agrestis* at Nantucket; likewise on Cuttyhunk, where it was the only terrestrial species I could find.

I take this opportunity to note that *Helix hortensis* var. *bicolor* Ckll., 1891 (shell pink with upper part of spire yellow), is preoccupied by var. *bicolor* Picard, 1840. My variety may be named *dichroa*.—T. D. A. Cockerell.

Dr. Arnold Ortmann has recently returned from a successful campaign for *Unionidæ* in West Virginia.

PROFESSOR JOSIAH KEEP

The Nautilus.

Vol. XXV. OCTOBER, 1911. No. 6

PROFESSOR JOSIAH KEEP.[1]

BY WM. H. DALL.

Professor Keep, whose death, July 27th last, at Pacific Grove, California, was recently announced, was born in Paxton, Mass., in 1849, and was a graduate of Leicester Academy and Amherst College (1874), taking his Master's degree as a postgraduate student in 1877. In that year he married Amelia Caroline Holman, of Leicester, Mass., and went to California. There he taught in the Golden Gate Academy and the Alameda High School, being principal of the latter from 1881 to 1885. In 1885 he became Professor of the Natural Sciences in Mills College, which, from small beginnings as a private seminary for girls, has through the efforts and generosity of its founders developed into a well-equipped and charmingly situated college, the Wellesley of the Pacific Coast.

Here Professor Keep found his life-work as teacher and coadjutor with the still surviving founder, Mrs. Mills, and saw the branches of science originally confided to him alone, by degrees represented in the teaching force by a number of competent instructors, while he retained for himself the subjects of geology and astronomy.

With the wide general knowledge required by his field of work, it was of course impossible for him to be a specialist in any, but his deep interest had been aroused in the study of the mollusca in which the Pacific Coast is so rich. Between 1881 and 1911 he published a series of what might be called primers of west-coast shells, illustrated with figures, enabling the beginner to gain a preliminary

[1] From *Science*, October, 1911.

knowledge of the attractive shells of California. To these little books we may fairly ascribe much of the wide-spread interest which is to-day found among Californians and which by the coöperation of amateurs with specialists, has immensely increased our knowledge of the Pacific Coast fauna.

The last of these manuals was published only shortly before his death. Professor Keep was one of the founders of the Chautauqua Assembly which meets at Pacific Grove, and frequently lectured to its classes on his favorite subject. He was also one of the most earnest supporters of the Museum and Library at Pacific Grove.

Modest, courteous, indefatigable and enthusiastic, he was primarily a teacher and organizer; beloved by his classes and appreciated by those reached through his books and so led to the study of nature. In his unassuming way he has done a good work and found his reward in doing it. He leaves a widow, son and daughter to mourn his loss.

ADDITIONAL NOTES ON THE LOCOMOTIVE DISK OF STYLOMMATOPHORA.

BY V. STERKI.[1]

During the last years some additional observations on this subject were made. Nearly all of the species mentioned in the former article have been seen again and the data were verified, and some others were examined. To repeat, there are marked differences in this respect, between species, genera and groups apparently or really closely related, especially among the *Zonitidæ*, and these features have probably much significance in classification, in connection with the formation of the lateral (marginal) longitudinal groove or grooves, on the upper surface of the foot (pedal grooves), and possibly the presence or absence of the caudal mucus gland, as pointed out, *e. g.*, by Dr. Pilsbry.[2] More observations and morphological and anatomical examination are needed on the subject.

Zonitidæ.

Omphalina fuliginosa (Griff.). The median zone was seen (or

[1] See article in THE NAUTILUS, XXII, p. 49, 1908.

[2] In the generic position of *Patulastra* * * * with suggestions of a classification of the American *Zonitidæ*, THE NAUTILUS, IX, p. 19.

appeared) to extend to the very posterior end of the sole, and each wave starts there.

O. inornata (Say). Foot very long and slender; zones rather distinct, narrow, but widening to nearly the whole width of the sole at the anterior end. Apparently there is an additional marginal zone along each margin, quite narrow and whitish. Waves distinct in the median zone, about 10 simultaneously.

O. lævigata perlævis (Pils.) (from Ky.). Three zones slightly marked, not in color, which is grayish with a slight olive tinge. Waves plainly visible, about 8.

Vitrea [= *Hyalina*] *wheatleyi* (Bld.). Sole very narrow; zones rather distinct, even with slight furrows marking them when the sole is detached; the median about the width of the marginals, in the middle, wider near the anterior end. Waves distinct in the anterior two-thirds (as in *radiatula*).

V. draparnaldi (Beck). Sole narrow; three zones distinct, the median slightly wider than the marginals, very narrow posteriorly, and not reaching the posterior end. Here also, when the sole is detached from the substratum, there are two rather deep sulci between the zones. Waves distinct, 8–10, in rapid succession; anterior end of the foot progressing with a slight jerk as each wave reaches it. Margin of the foot above marked off by two longitudinal furrows (on each side).

Gastrodonta intertexta (Binn.). No zones marked, not a trace of waves, just as in *G. ligera*. The margin of the foot above, outside of the longitudinal furrow, is rather broad and of a more yellowish tinge than the balance of the dorsum.

G. suppressa var.?[1] No zones, and no waves seen, even in direct sunlight, transmitted.

Euconulus chersinus (Say). No waves seen; no zones on the surface; zones slightly marked internally in transmitted light (as it would be in all snails).

Limacidæ.

Limax maximus L. Sole with three zones rather sharply defined, the median rather narrower than the marginals. Waves very distinct, about 20 in large specimens, from very near the tail end, each

[1] Rather large, with higher spire; a heavy deposit (callus) in the last whorl near the aperture, but no lamellæ; may be distinct.

wave (= muscle contraction) much shorter than the interval (in space).

Agriolimax agrestis (L.).[1] Three zones distinct, the median, rather narrow, does not reach the anterior end, so the marginal is continuous all around. Waves distinct, about 16 (in specimens 35 mm. long) in rapid succession.

Arionidæ.

Arion rubellus St.[2] A slightly and not sharply marked median zone, wider towards the anterior end, somewhat hyaline, that is: with few or none of the yellowish opaque (glandular?) granules disseminated in the rest of the sole. Waves visible, but not distinctly, more remote from the surface of the sole than in *Polygyra* and *Limax*, and more remote from each other than in *Agriolimax agrestis*, and proceeding slower.

Philonaycidæ.

Philomycus dorsalis (Binn.). No well marked zones, and no waves seen.

Helicidæ—Polygyrinæ.

Some additional *Polygyræ* examined show essentially the same features as those noted before; all with distinct zones and waves.

P. albolabris (Say). Foot and sole light-colored, not drab, and color in the three zones little different; waves about 12.

P. multilineata (Say). Sole drab-colored; waves 9–10.

P. appressa (Say). Sole long and narrow; waves 10–11, comparatively numerous for the size of the snail.

P. stenotrema (Fér.). Waves about 7.

P. hirsuta (Say). Median zone grayish, marginal dull, pale reddish to purplish, with strongly marked transverse lines. Waves about 7.

Pupidæ.

Bifidaria pentodon (Say). Foot very short; zones not evident on the sole; waves distinct, about 3, extending over nearly the whole width of the sole.

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[1] From one place (in Lake Co., Ohio) several dozen were collected, showing extremes of color: from whitish without any dark mottlings to almost entirely black; some of a tan to brownish tint.

[2] From a nursery in Lake Co., Ohio. Appears to be distinct from *hortensis;* described about 1682; European.

THE NOMENCLATURE OF HARPA.

BY CHARLES HEDLEY.

Australian Museum, Sydney, N. S. Wales.

Application of the law of priority to the genus *Harpa* is attended with the usual wreckage of familiar names. Not having observed any recent adjustment of this nomenclature, I offer the following notes:

The generic name of *Harpa*, as Dr. W. H. Dall has pointed out (Journ. of Conch., XI, 1906, p. 296), should be ascribed to Bolten (Mus. Bolt. [2], 1798, p. 149), not as in Fisher's Manual, to Rumphius, who was prenomial, or to Lamarck, who was a year later.

According to Hanley's examination of Linnean types (Ipsa Linn. Conch., 1855, p. 251), *Harpa nobilis* Lamarck, usurps the place of *Buccinum harpa* Linn., which should become *Harpa harpa* Linn. Yet most writers followed Lamarck in reducing *Buccinum harpa* to the synonymy of *Harpa ventricosa* Lamarck.

Hanley continues to show that by *Buccinum costatum* Linn. is meant *Harpa imperialis* Lamarck. Deshayes (An. s. vert., X, 1844, p. 129, footnote) had already censured Lamarck for his superfluous name, and recommended the restoration of *Harpa costata* Linn.

Bolten was the first to separate binomially the species that Linné had confused. For one of these, illustrated by Martini, figure 1090, he proposed (*op. cit.*, p. 149) the name *Harpa major*. Lamarck later included the same figure of Martini in the synonymy of the species he proposed to call *Harpa ventricosa*.

Similarly for the species illustrated in the Conchylien Cabinet by fig. 1092, Bolten proposed *Harpa davidis*, and for the same Lamarck subsequently introduced *Harpa articularis*.

Again, to the shell shown by Martini in fig. 1094, Bolten gave the name of *Harpa doris*, for which Lamarck afterwards substituted *Harpa rosea*.

Finally, Bolten gave the name of *Harpa amouretta* to a species illustrated by his predecessors, figure 1097. This later served to express the *Harpa minor* of Lamarck.

Suter (Deutsch. Malak. Ges. Jahrbuch, IV, 1877, p. 129), divided the genus into sixteen recent species. These Tryon re-

duced to nine (Man. Conch., V, 1883, p. 97). Adding a distinct Australian species to the latter estimate, the genus will stand thus (synonyms in italics).

HARPA Bolten, 1798 = *Harpa* Lamarck, 1799.
H. harpa Linné, 1758 = *H. nobilis* Lam., 1822.
H. costata Linné, 1758 = *H. imperialis* Lam., 1822.
H. major Bolten, 1798 = *H. ventricosa* Lam., 1822.
H. davidis Bolten, 1798 = { *H. articularis* Lam., 1822. / *H. conoidalis* Lam., 1822.
H. doris Bolten, 1788 = *H. rosea* Lam., 1822.
H. amouretta Bolten, 1798 = *H. minor* Lam., 1822.
H. cancellata Bolten, 1798 = *H. striata* Lam., 1822.
H. crenata Swainson, 1822.
H. gracilis Broderip. and Sowerby, 1829.
H. punctata Verco, 1896.

MOLLUSKS OF WELLESLEY ISLAND AND VICINITY, ST. LAWRENCE RIVER.

BY FRANK C. BAKER.

Several years ago the writer spent two weeks at Thousand Island Park, and a collection of the mollusks of the nearby region was made. Local lists from this part of New York State are lacking, and the following catalogue may be of interest for this reason. The localities where collections were made are as follows, all being in Jefferson County, N. Y.:

1. Goose Island, near Wellesley Island.
2. South Bay, Wellesley Island.
3. Blind Bay, New York shore.
4. Watson's Point, Wellesley Island.
5. Thousand Island Park, Wellesley Island.
6. Lake Waterloo, Wellesley Island.

The Thousand Islands lie in the head of the St. Lawrence at the outlet of Lake Ontario. Wellesley Island is one of the large islands. It is high and rocky, the rocks being granitic. It is well wooded over a rolling surface, with here and there a pond or swamp.

PELECYPODA.

Lampsilis ventricosa (Barnes), Station 2, rare.
Lampsilis radiata (Dillwyn). Stations 1, 2, common.
Anodonta marginata (Say). Station 2, common.
Unio nasutus (Say). Stations 1, 2, common.
Unio complanatus (Solander). Stations 1, 2, common.

GASTROPODA.

Campeloma decisum (Say). Station 6, rare.
Campeloma integrum obesum (Lewis). Stations 2, 3, rare.
Valvata lewisii (Currier). Station 2, rare.
Bythinia tentaculata (Linn.), Station 5, common.
Goniobasis livescens (Menke). Stations 2, 6, common.
Physa gyrina (Say). Station 5, common.
Planorbis trivolvis (Say). Stations 2, 4, 6, common.
Planorbis binneyi (Tryon). Station 2, common.
Planorbis bicarinatus (Say). Station 2, common.
Planorbis campanulatus (Say). Stations 2, 4, 6, common.
Planorbis parvus (Say). Station 5, rare.
Planorbis hirsutus (Gould). Station 5, common.
Segmentina armigera (Say). Stations 2, 6, common.
Lymnæa stagnalis appressa (Say). Stations 2, 3, common.
Galba palustris (Müller). Stations 2, 5, 6, common.
Strobilops labyrinthica (Say). Station 4, not common.
Bifidaria contracta (Say). Station 5, common.
Succinea ovalis (Say). Station 5, common.
Succinea retusa (Lea). Stations 4, 5, common.
Polygyra tridentata (Say). Station 5, common.
Polygyra albolabris (Say). Station 5, common.
Polygyra fraterna (Say). Stations 4, 5, common.
Circinaria concava (Say). Station 4, not common.
Vitrea hammonis (Ström). Stations 4, 5, common.
Vitrea indentata (Say). Station 5, common.
Euconulus fulvus (Müll). Station 4, rare.
Zonitoides arboreus (Say). Stations 4, 5, common.
Agriolimax campestris (Binney). Station 5, common.
Philomycus carolinensis (Bosc.). Station 5, rare.
Pyramidula alternata (Say). Stations 4, 5, common.
Helicodiscus parallelus (Say). Station 4, common.

EPIPHRAGMOPHORA CALIFORNIENSIS, AND THE SHELLS COMMONLY CALLED VARIETIES THEREOF.

BY HENRY M. EDSON.

My attention was first attracted to the complexity of the nomenclature of this group two years ago, while trying to identify a shell which afterwards proved to be a deformed *Epip. nickliniana* Lea. Since then I have made a very careful study of the group, and have collected over the entire distribution area, and particularly at the type localities.

Dr. H. A. Pilsbry's[1] catalogue of American land shells was the last work of any scientific value dealing with these species, so I have taken that as a base from which to work, and will discuss separately each of the varieties he retained, and afterwards give my conclusions. The following shells were retained in his list:

Epip. californiensis Lea.
Epip. californiensis, var. *nickliniana* Lea.
Epip. californiensis, var. *anachoreta* W. G. B.
Epip. californiensis, var. *ramentosa* Gld.
Epip. californiensis, var. *bridgesi* Newc.
Epip. californiensis, var. *diabloensis* J. G. C.

Epiphragmophora californiensis Lea.

This is a species of the maritime region of the Upper Sonoran faunal belt, of very limited distribution. It is found most abundantly at Point Pinos, Monterey Co., collected sparingly at Point Cypress and Point Lobos, and at a few intermediate localities covering a distance of about twenty miles. It is usually found in the loose sand at the base of plants and small shrubs; I have counted as many as one hundred collected around the roots of a purple sea aster. The young shells are conical with closed umbilicus.

Epip. californiensis, var. nickliniana Lea.

This is a subspecies of the wooded zone of the Upper Sonoran belt, but overlaps into the Humid Transitional. It shows great variation, which fact was early recognized by Dr. Newcomb.[2] It is widely

[1] Nautilus, xi, 1897.

[2] Amer. Jour. Conch., I, p. 342, 1865.

distributed, extending from north of Santa Rosa, south on both sides of San Francisco bay to Monterey on the coast, and San Benito Co. in the interior.

In a shell of so large a distribution it stands to reason that there will be variation, caused by lack of lime for shell-making in some cases, and in other cases to lack of moisture. It has been my experience that the shells collected in wet places were larger, with a more open umbilicus, than those from the more arid regions.

That *nickliniana* Lea is a variety of *californiensis* Lea I can find no proof. The young of *californiensis* are high-spired with closed umbilicus, the shells do not show the reticulated surface to any extent, and it is strictly a maritime species; while the young of *nickliniana* are planulate with an open umbilicus, the shells always show the reticulated surface, and it inhabits the moister spots in the wooded zone.

That *nickliniana* and *ramentosa* are identical no one can doubt who has studied and collected them. I have in my collection a set of twenty *nickliniana* from a small canyon in the foothills back of Palo Alto, from which it is possible to select as many different forms, running from a high spire with the lip almost entirely reflected over the umbilicus to low spire with a widely-open umbilicus. The reticulated surface and the purplish color of the nacre inside the aperture are present in all of the forms of *nickliniana*. In some localities the color band is obsolete.

E. nickliniana might be called the typical mollusk of the Upper Sonoran fauna belt in the central portion of the Coast Range system.

Epip. californiensis, var. anachoreta W. G. B.

This was a deformed *nickliniana*, and was so recognized by Mr. Binney[1] in later writings.

Epip. californiensis, var. ramentosa Gld.

A small form of *nickliniana* from Bolinas, which does not differ from *nickliniana* except in size. I have a set from the same locality, which run from large to small, with both open and closed umbilicus.

Epip. californiensis, var. bridgesi Newc.

Described from a solitary dead shell from San Pablo, in which

[1] Bull. 28, U. S. N. M., p. 132, 1885.

Dr. Newcomb failed to recognize the connecting link between *ramentosa* and *nickliniana*. He says,[1] "Its nearest approach to any described California species is to *H. ramentosa* Gld., which is much smaller in size, more solid in structure, with a more depressed spire, lighter color and more scaly granulations; from *H. nickliniana* Lea it is readily distinguished by its large umbilicus and difference in form."

Mr. Binney[2] placed it in the synonymy of *ramentosa*.

Epip. californiensis, var. diabloensis J. G. C.

This was another solitary dead shell, in the California State Collection, which was supposed[3] to have been collected in the Mount Diablo range by Prof. Brewer of the Geological Survey, who crossed the range near New Idria, in lat. 36° 30′, a distance of about two hundred miles south of Mount Diablo, which later writers have given as the type locality of *diabloensis*.

I fail to see anything in Cooper's description which in any way shows an affinity with this group, and suspect that the specimen was a form of *traski*. I have *traski* from Coalinga, which is about twenty miles south of New Idria, that fit the description very well. The shell figured by Binney,[4] Fig. 113, seems to me to be identical with the one figured as *bridgesi*, Fig. 109, and most certainly the shells from the vicinity of Mount Diablo are not the *diabloensis* of Cooper.

A list of the principal synonymy follows:

Epip. californiensis Lea.

Helix californiensis Lea, Obs., II, 99, 1839.
Helix vincta Val., Voy de la Venus, Moll. pl. I, fig. 2.

Epip. nickliniana Lea.

Helix nickliniana Lea, Obs., II, 100, 1839.
Helix californiensis Reeve, Con. Icon., no. 66.
Helix arboretorum Val., Voy de la Venus, pl. 1, fig. 3.

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[1] Proc. Cal. Acad. Sci., II, p. 91, 1861.

[2] Bull. 28, U. S. N. M., p. 133, 1885.

[3] J. G. Cooper, Proc. Cal. Acad. Sci., III, p. 260, 1866.

[4] Bull. 28, U. S. N. M., p. 134, 1885.

Helix nemorivaga Val., Voy de la Venus, pl. 1, fig. 1.
Helix ramentosa Gld., Proc. Bost. Soc. Nat. Hist., VI, 11, 1845.
Helix anachoreta W. G. B., Proc. Phil. Acad., 185, 1857.
Helix reticulata Pfr., Mal. Blatt., 87, 1857.
Helix bridgesii Newc., Proc. Cal. Acad., II, p. 91, 1866.
Arionta californiensis, var. *nickliniana* W. G. B., Bull. 28, 1885.

EXTRACTS FROM THE LOG OF THE EOLIS.

BY JOHN B. HENDERSON, JR.

The following extracts taken from the log-book of the *Eolis* are offered to the NAUTILUS readers at the editor's suggestion. The *Eolis* is a fifty-foot motor cruising yacht built by the writer especially for the purpose of dredging, and is provided with hoisting machinery, etc. At the time of these entries in the log the boat was cruising in south Florida waters, with Key West, and later, Tortugas, as headquarters. Mr. George H. Clapp, of Pittsburgh, was on board during both cruises. The passages from the log are taken quite at random:

"April 18, 1910" (in the Hawk Channel). ". . . coming in sight of Loue Key, a mere patch of coral sand on an exposed bit of the outer Florida Reef, we decide to try for some reef collecting, the tide being favorable. We run the *Eolis* almost to the key on the lee side, but with breakers all about us. The Captain, Clapp and I go ashore in the tender, leaving the *Eolis* rolling in uncomfortably shoal water. It is difficult here to record the first impressions of this our first experience on a tropical reef. At last the fine ones are to be had for the picking. In nervous haste we turn over the coral slabs and inspect their under sides. There they are, bright, shining, alive and beautiful: *Cypraea cinerea* and *spurca*, *Conus mus* and *floridana*, *Mitra barbaderis* and *nodulosa*, one excellent specimen of *Mitra fergusoni*, *Cassis*, *Pisania*, *Trivia*, *Oliva*, *Olivella*, and so on. The wash of the surf over the coral rocks where we are collecting, deprives us, I am sure, of many specimens, both by hiding them from sight and by washing them away. . . . Our catch, in two rather strenuous hours' work, is amazing in quantity and quality . . . arrive in Key West at 3 p. m."

"April 19, 1910" (Key West). "4 a. m.—Start for outer

channel buoy, cross the reef and put to sea for a few hauls on the edge of the Gulf Stream. Weather fine, sea smooth . . . 3d haul in 110 fathoms on a rocky rough bottom made even more difficult to negotiate by the strength of the current. We are now fairly on the 'Pourtales Plateau,' that narrow strip of sea-bottom which is pure gold in our imaginations. Possibly we expect too much from this happy hunting ground of Pourtales, for whatever may be its reputed treasures they are certainly well protected by the nature of their surroundings. This haul, made with great difficulty, brings up some fine brachiopods, some very beautiful Marginellas, and Eureka! *Voluta dohrni*. I am sure Clark will appreciate the wonderful yellow sea-urchins. . . ."

"April 22, 1910. . . . What a day this has been on Sand Key Reef. Were it not that the keen edge of our excitement has been dulled by a day on Loue Key Reef I am sure some of us would have become 'dippy.' As it is, our conduct to any chance observer might have raised suspicions. We danced and sang and called to each other in our eagerness to exhibit new things discovered. We must all drop everything and go over there to see the beautiful calico-patterned orange-colored mantle of *Ultimus gibbosus*, or all must hurry over here to see this octopus before he succeeds in wholly effacing himself. We fairly reveled in *Cypraea*, *Conus* (especially very fine *C. nebulosus*), *Mitra*, *Pisania*, *Pecten*, *Columbella*, *Marginella*, *Calliostoma*, *Turbo*, *Purpura*, *Latirus*, *Phos*, *Tritonidea*, *Lima*, *Avicula*, *Lithodomus*, etc., etc. . . . Blow, blow, blow, will it ever stop blowing so we may go to work outside again? We pick over siftings for hours until our eyes rebel against the strain. The amount of small and minute stuff is astonishingly great in the siftings. So much of this escapes detection when the material is wet. A most gratifying number of species of *Drillia*, *Mangilia*, and other Pleurotomids turn up this way. Especially noteworthy are the pretty *Ancistrocyrinx radiata* and *Niso interrupta*, both of which have a Chinese or Japanese appearance. Numbers of Pyramidellids are appearing in the pickings. We all like these graceful highly-sculptured little shells; the crew call them 'peakers.' I hope Bartsch will not get too much discouraged when he sees them. There are so many little bivalves that I have never seen before, and indeed many Gasteropods of genera wholly unknown to me. . . ."

(*To be continued.*)

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COLLECTING SHELLS FROM THE ABALONE.

BY T. S. OLDROYD.

At White's Point, four miles from San Pedro, California, is a station for the Japanese abalone gatherers. They go around to the different islands and places along the main shore where they are plentiful. The divers, in their suits, go down in from two to six or eight fathoms, pry the shells from the rocks, and put them in a sling net, and they are hauled on deck, the average day's work being from one to two tons. They are brought to the station, where the meat is taken out, boiled, dried in the sun, packed in cans and shipped, mostly to China, I am told, where they are considered quite a delicacy. The shells are piled up on shore, and are sold to jewelry and novelty manufacturers. The red abalone (*Haliotis rufescens* Swains.) they get on the island of Santa Cruz and places to the north of here, while the Green Abalone (*Haliotis fulgens* Phil.), the corrugated (*Haliotis corrugata* Gray), and the black (*Haliotis cracherodii* Leach) are found further south. The shells are not things of beauty to look at in their natural state, most of them being badly worm-eaten and covered with moss, barnacles and Vermetus tubes; *Lithophagus plumula* Hanl., and *Pholadidia sagitta* Stearns bore holes in the shells and sometimes bore through and the animal has to protect itself by covering them over with patches of nacre. Among the moss barnacles and Vermetus, are ideal protected places for the small and microscopic shells to live in. None of these live on the abalone exclusively, but in the protected places in the rocks and stones, as well. I do not know as they prefer the Haliotis to

the rocks, but I think he is a good-natured inoffensive big fellow and does not eat up his little neighbors and companions. We have a *Barleeia* that is said to be a lover of the Haliotis, but I have found but very few of them, the *Odostomia* being by far the most plentiful.

When it gets dull on the farm and we want a day's outing, Mrs. Oldroyd and myself go to White's Point for a day's collecting. We do not have to wait for a low tide or go near the water, but make us a comfortable seat at one of these large piles of shells and pick off the little shells till we get tired. We find out where the abalone comes from so as to get the locality of the small shells.

The following list is what we got in a few days' collecting, but this is nowhere near the limit to what might be found. They were determined from others in our collection, which were determined at Washington through the kindness of Doctors Dall and Bartsch:

Odostomia tenuisculpta Cpr.
Odostomia straminea Cpr.
Odostomia helga D. & B.
Marginella varia Sby.
Marginella regularis Cpr.
Marginella pyriformis Cpr.
Marginella jewettii Cpr.
Diala marmorea Cpr.
Diala acuta Cpr.
Triforis catalenensis Bartsch.
Triforis montereyensis Bartsch.
Eulima distorta Cpr.
Jeffreysia bifasciata Cpr.
Jeffreysia translucens Gld.
Rissoina dalli Bartsch.
Rissoa grippiana Dall.
Ethalia supravallata Cpr.
Vitrinella oldroydi Bartsch.
Cerithiopsis assimilata C. B. Ad.
Cerithiopsis cosmia Bartsch.
Bittium quadrifilatum Cpr.
Bittium rugatum Cpr.
Turbonilla buttoni D. & B.
Turbonilla tenuicula Gld.
Leptothyra bacula Cpr.
Phasianella pulliodes Cpr.
Eulithidium substriatum Cpr.
Calliostoma supergranosum Cpr.
Erato columbella Mke.
Lacuna unifasciata Cpr.
Isapis fenestrata Cpr.
Megatebennus bimaculatus Dall.
Amphissa versicolar Dall.
Mitramorpha aspera Cpr.
Mitramorpha filosa Cpr.
Columbella penicillata Cpr.
Barleeia subtenuis Cpr.
Barleeia haliotiphila Cpr.
Placiphorella velata Cpr.
Anachis subturrita Cpr.
Lepidopleurus oldroydi Bartsch.
Lepidopleurus nexus Cpr.
Acanthochites diegoensis Pils.
Trachydermon dentiens Gld.
Crepidula dorsata Brod.
Lyonsia inflata Conr.
Lima dehiscens Conr.
Cardita subquadrata Cpr.

Mangilia nitens Cpr.
Aesopus myrmacoon Dall.
Tornatina harpa Dall.
Leptothyra paucicostata Dall.
Leptothyra paucicostata var. rubra Dall.
Kellia laperousii Desh.
Lasea rubra Cpr.
Saxicava arctica Linn.
Bryophila setosa Cpr.
Sphaenia californica Conr.
Hipponix tumens Cpr.

LAND SHELLS OF MONROE CO., PENNSYLVANIA.

BY H. A. PILSBRY.

During September, 1909, I spent a couple of weeks at Bartonsville, Monroe Co., Pa., and employed some of my leisure in collecting shells. The country rock is a shale of Hamilton age. The shells were mostly taken on a steep, stony, wooded hillside facing east, and in a pasture under stones. The species taken are for the greater part common. See also NAUTILUS XXI, p. 67, where Mr. Joshua Baily, Jr., lists Monroe County shells.

Polygyra albolabris (Say).
Polygyra tridentata (Say).
Polygyra fraterna (Say).
Polygyra hirsuta (Say).
Pyramidula alternata (Say).
Pyramidula cronkhitei catskillensis (Pils.).
Helicodiscus parallelus (Say).
Punctum pygmæum (Drap.).
Sphyradium edentulum (Drap.).
Vitrea hammonis (Ström).
Vitrea rhoadsi (Pils.).
Vitrea indentata (Say).
Euconulus chersinus (Say).
Zonitoides arborea (Say).
Zonitoides minuscula (Binn.).
Gastrodonta suppressa (Say).
Succinea ovalis Say.
Vallonia excentrica St.
Vallonia costata (Müll.).
Bifidaria pentodon (Say).
Vertigo ovata Say.
Vertigo gouldi Binn.
Cochlicopa lubrica (Müll.).

NEW CUBAN UROCOPTIDÆ, II.

BY PROFESSOR CARLOS DE LA TORRE.

(*Concluded from p. 48.*)

UROCOPTIS (GONGYLOSTOMA) TURGIDA n. sp.

Shell rimate, swollen-cylindric, rapidly tapering to a truncate cone above; suture simple. Whorls 8–9, a little convex. Brown, mar-

bled with zigzag whitish flames; last whorl violet-brown. Surface shining, weakly ribbed striate. Aperture large, transversely ovate-oblong, with the internal axial fold strong. Axis encircled by two, rarely three, compressed lamellæ, the lowest broadly expanded in the last two whorls; other axial characters as in *U. proteus*.

Long. 25, diam. 8.6, ap. long. 6.2, ap. diam. 5.2. Whorls 9.

Long. 20, diam. 7.5, ap. long. 5.6, ap. diam. 5. Whorls 8.

Long. 22, diam. 8.6, ap. long. 6, ap. diam. 5. Whorls 8.5.

Var. "a." Smaller, more swollen-fusiform.

Long. from 16 to 19 mm.; diam. 7 to 8 mm.

Central Cuba; Sierra de Bamburanao near Seibabo de Yaguajay, province of Santa Clara.

This may be regarded as a more obese member of the *U. proteus* group. Both forms live in the same locality, but *U. proteus* dwells under stones, while *U. turgida* finds a permanent habitat on the upper side of stones.

Urocoptis (Gongylostoma) uberrima, n. sp.

Shell rimate, ovate-oblong, very inflated, more swollen above the middle and rapidly terminating in a narrow concave truncation; somewhat solid; pale chestnut colored indistinctly clouded with darker brown and with whitish areas, last whorl purplish brown. Surface obliquely regularly rib-striate; suture simple. Whorls 7–8, a little convex, the last shortly free in front, with a cord-like keel around the base. Aperture transversely ovate, brown within, the peristome, columella and upper wall, white. Axial fold prominent. Peristome expanded and reflexed. Axis encircled by two subequal lamellæ above the middle, somewhat stout, and by three lamellæ in the antepenultimate and penultimate whorls, the lower the largest.

Long. 17, diam. 8.2, ap. diam. 4.5, ap. long. 5.2. Whorls 8.

Long. 14.5, diam. 8, ap. diam. 4.3, ap. long. 5. Whorls 7.

Long. 16, diam. 8, ap. diam. 4.2, ap. long. 5. Whorls 7.5.

Central Cuba; Sierra de Santa Rosa, between Remedios and Seibabo de Yaguajay, Prov. of Santa Clara.

Differs from *U. turgida* by its smaller size, obovate shape, less distinct color pattern, and by the axis.

Urocoptis (Gongylostoma) intuscoarctata, n. sp.

Shell similar externally to *U. cioniscus* but the axis bears two

small sub-equal compressed lamellæ above, the upper one disappearing or becoming a low cord at the middle, and the lower, denticulate above, expands in the antepenultimate whorl into a somewhat upward flaring broad plate, as in *U. fabreana:* in the last two whorls this lamella is reduced again, almost disappearing in the last one.

Long. 29, diam. 6, apert. diam. 5.3. Whorls 13.

Long. 23, diam. 5.6, apert. diam. 5. Whorls 10.

Long. 25, diam. 6, apert. diam. 5.2. Whorls 10.

Central Cuba; Sierra de Canoa at Las Llanadas, District of Mayajigua, Province of Santa Clara.

This species belongs to the Section *Esochara* Pils. and Van., and is near *U. fabreana*, but differs in color, the close riblets, whorls more convex, and chiefly by the upper lamella of the axis not being obsolete above. Affinities with *U. intermedia*, etc., are evident.

UROCOPTIS (GONGYLOSTOMA) DIMIDIATA, n. sp.

Shell very similar externally to *U. turgida*, though differing in color, the whitish flames being fewer and less undulated. Axis (as in *U. strangulata*) "with two spiral lamellæ above, the lower one expanding in a broad, flat plate or spiral disk in the antepenultimate and penultimate whorls, nearly reaching the outer wall of the cavity." In the last whorl this lamella is reduced and the upper one effaced.

Long. 28, diam. 9, ap. diam. maj. 7.2, ap. diam. min. 6.2, whorls 10.

Long. 22, diam. 8, ap. diam. maj. 6.6, ap. diam. min. 6, whorls 8.

Long. 25, diam. 8.8, ap. diam. maj. 7, ap. diam. min. 6, whorls 9.

Central Cuba: Vereda de los Boqueles, over the mountain near Aguada, district of Mayajigua, province of Santa Clara.

The rejected portion of the spire (7 to 8 whorls) rapidly and concavely tapering, striate, with the two and one-half embryonic whorls smooth, corneous and slightly bulbous. Differs from *U. strangulata* by its swollen shell, color pattern, less widely-spaced riblets, larger and transversely ovate aperture, etc. From *U. intuscoarctata* differs by these same characters and also by the more expanded disk of the lower lamella, and the upper one effaced only in the last whorl.

U. DIMIDIATA INTERMEDIA, n. var.

Differs from typical *U. dimidiata* in more slender contour of shell. Its color is corneous, with occasional inconspicuous brown streaks. Aperture sub-circular.

Long. 26, diam. 6.8, ap. diam. 5.4, whorls 11.

Long. 21, diam. 6, ap. diam. 5, whorls 9.

Long. 23, diam. 6.5, ap. diam. 5.2, whorls 9.5.

On stones: Vereda del Chorreron, near Aguada, in the district of Mayajigua, province of Santa Clara.

An entire small specimen contains 16 whorls and has a length of 25 mm. This variety is somewhat similar to *U. fallax*, but internally it is intermediate between *U. dimidiata* and *U. intuscoarctata.*

Urocoptis (Gongylostoma) alvearis, n. sp.

Shell thin, shortly rimate, oblong, widest above the middle; spire tapering to a very short truncate cone; brown, becoming purple-brown on last whorl. Sculptured with narrow, oblique, whitish ribs separated by spaces about four times width of ribs. Whorls 7–9, slightly convex, the last very shortly free, its base defined by a very low or obsolete cord. Aperture nearly circular, dull purple within; columella and upper portion of the peristome white. Peristome broadly expanded and the upper margin reflexed. Columellar lamella prominent. Axis with two compressed lamellæ, the lower one larger, broadly expanded in the last two whorls, forming a horizontal disk extending one-third distance from axis to outer wall.

Long. 20, diam. 9.2, ap. long. 6.7, ap. diam. 7.2.

Long. 16, diam. 8, ap. long. 5, ap. diam. 5.5.

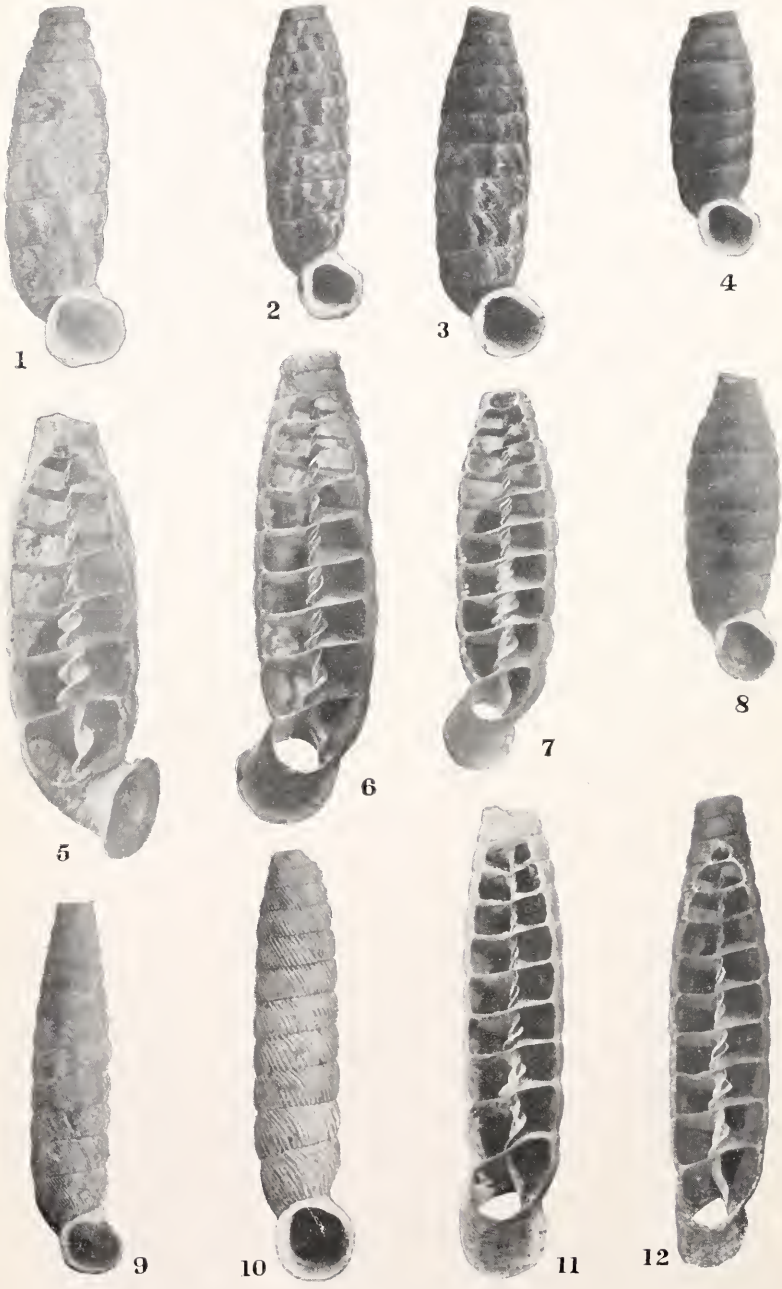
Long. 20.8, diam. 8, ap. long. 6, ap. diam. 6.5.

Central Cuba: La Puntilla, near Remedios, in the Santa Clara province.

Differs from *dimidiata* and *turgida* by the shorter, broader shape and much more widely-spaced ribs and less expanded axial disk. The two and one-half embryonic whorls are smooth and very convex, as in other species of this group, with a diam. of 1.4 mm. The following four whorls are weakly and very obliquely striate, after which the ribbed sculpture is assumed, irregular and rather weak at first, but becoming strong and regular on the eighth whorl. The first eight whorls increase in diameter very slowly, after which the shell abruptly expands.

Urocoptis (Gongylostoma) tuba n. sp.

Shell similar to *U. alvearis* in color, sculpture and axial plan but differs from that species by its more slender contour and by the much



NEW CUBAN UROCOPTIDÆ.

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NEW CUBAN UROCOPTIDÆ.

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NEW CUBAN UROCOPTIDÆ.

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NEW CUBAN UROCOPTIDÆ

more gradually tapering spire, the lateral outlines of which are not so deeply concave.

Long. 24.5, diam. 7.5, ap. long. 6.3, ap. diam. 6.5, whorls 10.

Long. 20.3, diam. 7.1, ap. long. 6.5, ap. diam. 6.9, whorls 7.

Central Cuba; Cerro de Guajahana near Caibarien in the Province of Santa Clara.

Reference to Plates IV–VII.

Plate IV.

Figs. 1, 5. Urocoptis villarensis n. sp. Page 42.
Figs. 2, 3, 6. Urocoptis proteus n. sp. Page 43.
Fig. 4. Urocoptis proteus castanea n. subsp. Page 44.
Figs. 7, 8. Urocoptis proteus robustaxis n. subsp. Page 44.
Figs. 9, 12. Urocoptis mayajiguensis n. sp. Page 45.
Figs. 10, 11. Urocoptis cioniscus n. sp. Page 46.

Plate V.

Figs. 13, 14. Urocoptis remediensis n. sp. Page 44.
Fig. 15. Urocoptis remediensis var. *a*. Page 45.
Fig. 16. Urocoptis remediensis var. *b*. Page 45.
Figs. 17, 21. Urocoptis mayajiguensis fulva n. subsp. Page 45
Figs. 18, 19, 20. Urocoptis transitoria n. sp. Page 46.
Figs. 22, 23. Urocoptis mayajiguensis var. *a*. Page 45.

Plate VI.

Figs. 24, 25. Urocoptis turgida n. sp. Page 75.
Fig. 26. Urocoptis turgida var. *a*. Page 76.
Figs. 27, 30, 31. Urocoptis tuba n. sp. Page 78.
Figs. 28, 29, 34. Urocoptis dilatata n. sp. Page 47.
Figs. 32, 33. Urocoptis fallax n. sp. Page 47.

Plate VII.

Figs. 35, 36, 37, 38. Urocoptis alvearis n. sp. Page 78.
Figs. 39, 40. Urocoptis uberrima n. sp. Page 76.
Figs. 41, 42. Urocoptis dimidiata n. sp. Page 77.
Figs. 43, 44. Urocoptis intuscoarctata n. sp. Page 76.
Figs. 45, 46. Urocoptis dimidiata intermedia n. subsp. Page 77.

A GOOD COLLECTING GROUND FOR SMALL SHELLS.

BY W. F. CLAPP.

The shells listed below were gathered at High Pines, Duxbury Beach, Mass. High Pines is a small hummock, separated from the mainland and any vegetation by eight miles of beach and sand dunes. The hummock itself which is only an acre in area, is covered with a dense growth of scrub oak, beach plum and sumac.

Considering the above conditions, it is interesting to note the quantity of specimens obtained from one square yard. I have included in the list approximately the number of specimens of each species found. Several of the species listed I have been unable to find in Duxbury on the mainland, and, on the other hand, species found in considerable quantities in Duxbury do not appear to inhabit High Pines.

On old charts of Duxbury Beach, the area connecting High Pines with the mainland appears as thickly wooded, but storms have removed all visible evidences of the former vegetation.

"For the benefit of those from Missouri," I will add, that I have a small quantity of soil similar to that from which these shells were taken, and will be pleased to divide the spoils with anyone caring to sort out the remainder, and thus verify my figures.

Vallonia pulchella Müller	1800
Zoogenites harpa Say	770
Pupilla muscorum Linn.	450
Zonitoides arborea Say	270
Cochlicopa lubrica Müll.	150
Helicodiscus parallelus Say	75
Helix hortensis Müller	25
Vertigo milium Gould	60
Vitrea hammonis Strom.	28
Bifidaria curvidens Gould	24
Punctum pygmaeum Drap.	23
Succinea ovalis totteniana Lea	17
Pyramidula cronkhitei anthonyi Pils.	2
	3694

EXTRACTS FROM THE LOG OF THE EOLIS.

BY JOHN B. HENDERSON, JR.

(*Concluded from p. 72.*)

"May 30, 1911" (off Key West). ". . . 6 a. m.—We take a position about where we failed yesterday in 50 fathoms, using the medium dredge for several unsuccessful hauls; then we bend on 'old Sampson' (our largest and heaviest dredge) and lower away. This time the bag comes up full of large broken shells, mostly Pectens and large bivalves all dead and worn, from shallow water; this is no good at all. Run out to 90 fathoms and make three very good hauls on the edge of the Pourtales Plateau. The features of the bag are some very interesting Murices of the *Pteronotus* group with wide foliated varices and quite suggestive of certain Pacific Coast species. Also *Murex beauii*, a very fine species of that fine genus. We especially rejoice over these Murices for with them added to our records we have nearly completed the list of Atlantic Coast Muricidæ. *Voluta dohrni*, *Calliostoma bairdii*, a superb *Fusus eucosmia* twice the size of any specimens I have ever seen. It nearly took our breath away. . . . The clearness of the water here is most striking. We always watch over the side of the boat to see who will first distinguish the dredge as it is being hauled up by the power winch. Its white skirts begin flashing so far below the surface we have been speculating upon the actual distance. We measured the rope to-day and found that we could actually see the dredge at 104 feet."

"June 11, 1911" (Key West). "In bagging the dried siftings of a haul made yesterday in 90 fathoms, we made the splendid discovery of a *Haliotis*. This is probably *Haliotis pourtalesii* of Dall, described by him from memory of the unique specimen which was destroyed in the Chicago fire. Pourtalès obtained his specimen right about here. This one just taken is now the only specimen 'in captivity.' We are quite excited about it . . . alas, we need all the cheer we can find, for the loss of our two carefully designed traps and 'old Sampson,' all in one day, has cast a gloom upon us . . . 61 fathoms, a fragment, though brightly colored, of *Voluta junonia*, the first in our records."

"June 6, 1911" (Key West). ". . . proceeding out we meet a stiff wind with swell and a nasty chop on top, but we try out a few

hauls nevertheless in shallow water, 20 fath. Position, close to outer edge of Florida Reef. Excellent bottom, though not very rich in mollusks. An apparently new *Scala*, with deeply channelled sutures, giving it a pagoda-like appearance, the ribs quite obsolete. The animal placed in alcohol at once exuded a large amount of purple liquid. We are pleased to see that it is possible to dredge in so rough a sea, but when wind, sea and current all pull together, it is hard."

"June 9, 1911" (Tortugas Islands). " . . . about three miles out from the big red sea buoy, five hauls on rough to hard sand bottom,—the poorest five hauls that any one ever made. One bright spot in the morning's work is a living *Voluta junonia*, a young specimen, but at last we may say that we have collected this rare and most desirable shell alive." . . . (on Garden Key, Tortugas). " . . . we discover a patch of coral rock making out from shore and we fall greedily upon it. The rock extends out but a short distance to the edge of the dredged channel to the Fort; there the bottom falls steeply to a depth of about thirty feet, the water being clear as crystal. Upon this pile of half-submerged rock we obtain some delightful collecting. Very fine specimens of a small race of *Cypraea exanthema* are abundant along with the usual run of reef species, all shells being very free of calcareous deposits. Red and yellow Pectens are abundant, clinging, for the most part, to the rocks by byssi; there are also pure white Limas that display their wonderfully-decorated mantle edges; they are very agile and dart about by a rapid spasmodic opening and closing of their shells. The larger specimens are always fixed by the byssus in crevices of the rocks. The Trochids and *Turbinidæ* are especially well represented on this reef. To facilitate our work we all enter the water regardless of clothes. It is too deep for rubber boots, the sun is too powerful for naked backs. We vary our labors by an occasional swim about the outer edge of the rocks,—it feels so odd to be fully clothed in the water . . . this little reef is perfectly delightful. A large quantity of exquisite fish of the 'Angel fish' type,—veritable butterfles as to color—hover about, almost touching our hands and acting in the most friendly and confidential manner, yet always skilfully avoiding capture by just eluding one's grasp; they seem not in the least frightened by such hostile demonstration. Now and then large fish weighing ten to twenty pounds come leisurely swimming along and inspect us

carefully, and then decide to hang around awhile. We are in a perfect aquarium,—a part of it—and we are upon the most intimate terms with all the other inhabitants. Great care must be taken to avoid touching the sharp-spined sea-urchins, especially the *Diadema*, whose purple and black spines are six inches long and as sharp as needles, brittle as glass and poisonous . . . such a wealth of crustacea, such beautiful Eolids with green and yellow filagree-work along their backs; they crawl over one's hands under water like caterpillars; such stealthy Octopi sneaking over the rocks,—one recoils from them as from a snake. How fascinating this reef collecting is. Poor Clapp; if these were only land shells, how much more he would enjoy it. . . ."

NOTES.

A Conchologist's Directory.—The undersigned intends publishing, on or before January 1, 1912, a Directory of American Conchologists. No charge is made for inserting names and addresses, but if a copy of the Directory is desired, send 25 cents as early as possible.

Persons ordering in advance may choose a subject and have the same designated after their name. Conchologists should state if they have a collection, the size of the same, and whether exchanges are invited, etc.

If sufficient interest is shown, the Directory will be published annually until the formation of a national society. Address,

Maxwell Smith, Hartsdale, N. Y.

Teaching Natural History.—So far as I know, this is the only high school in America where an effort is made in the regular zoology classes to teach pupils the systematic collection and naming of our common insects and shells. This may be right or it may not, but the unusual interest manifested in our classes urges me to write this, thinking that it may be helpful to others. I shall speak of the shells only.

I read to all my classes the peculiar incident told by Mr. Henderson in his Cuban trip collecting *Urocoptis elliotti*. It will open the eyes of over 100 boys and girls to see things when they go to Cuba.

I say "see" advisedly, for they have already seen two very remarkable things right here at home. The first was a find of *Valvata* in Washington Park, and the second a remarkable find of five species of land shells at 63d and Prairie Ave., where the South Side elevated "goes round the bend." There were hundreds of *Pyramidula striatella*, *Zonitoides*, *Vitreas* and *Vallonias*. These, mind you, were brought in by pupils who a month ago knew not of their existence. They also visit the greenhouses and pick up *V. draparnaldi*. And the keepers help them in their search. If we have no shell collectors in the next generation 'twill be no fault of mine.—E. E. Hand, Department of Zoology, Wendell Phillips High School, Chicago.

Nine hundred and twelve Pearls in one Unio.—W. H. Toms, a clam-digger of Adrian, Mich., found 912 pearls in a Raisin River clam. One hundred were of marketable size. Fifty are beauties, for which he expects a fortune.—*Public Ledger, Phila.*

Collecting on the Sipsey River, Alabama.—Since writing last I have made several excursions to the Sipsey. You will remember that, after my work at the Forks, we considered it rather a poor stream for *Unionidæ*. My present impression is that it is going to turn out one of the richest in Alabama, and decidedly peculiar. It is, in fact, very different from other rivers which I have explored. Most of it is "dead water," with a steady, pretty strong current and three or four feet deep; it is very crooked and choked with drift logs. Now and then there are gravel shoals, shallow, with an even, strong current, and these are the places for the mussels, especially *Pleurobemas*. These gravel shoals are altogether peculiar in my experience. The bottom is a layer of gravel, a foot or so thick, cemented so that it is quite hard; under this there is loose gravel, in which the mussels generally live. At the Forks I used to wonder why the muskrats left so many shells and I found so few. A farmer there, who had taken out river gravel for a road, gave me the explanation, which I have verified: only a few mussels are in the top layer, but great numbers of them under the cemented portion; the muskrats get to them through small crevices. The proper way to work these shoals will be to have a man dig away the cemented part, which is not very hard, and get to the layer beneath.—H. H. Smith.

THE NAUTILUS.

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A NEW GENUS OF BIVALVES FROM BERMUDA.

BY WILLIAM HEALEY DALL.

Among various minute shells sent for examination to the National Museum by Mr. Arthur Haycock, of Bermuda, is a minute triangular bivalve which at first looks like a very small, solid *Cumingia*, but on careful scrutiny under a compound microscope proves to be a new genus of the family *Mesodesmatidæ*. One complete specimen and a single valve are in the collection of Mr. Haycock.

ARGYRODONAX, n. g.

Shell small, concentrically sculptured, porcellanous, with a minute, smooth, nearly circular prodissoconch. Hinge formula $\frac{\text{L.1.0r101.1.}}{\text{R.0.1r010.0}}$ Pallial sinus large and deep, muscular scars large and strong; possessing a feeble external ligament and a narrow but strong resilium. General form tellinoid. Type:

ARGYRODONAX HAYCOCKI, n. sp.

Shell small, white, subtriangular, attenuated behind; sculpture of concentric threads growing coarser and more or less irregularly grouped toward the margin; lunular space impressed but not defined by any limiting sculpture; there is no escutcheon; ligament feeble, short, amphidetic external; resilium narrow, strong, situated in front of the posterior left cardinal tooth, and in the right valve in front of a ridge, which may be a feeble cardinal tooth or merely the raised

edge of the resiliifer; the right valve has a short, stout anterior and a high, thin, elongate posterior lateral tooth; both the laterals fit under the margin of the left valve with no obvious sockets. The anterior end of the shell is longer than the posterior, and is rounded; the shorter posterior end is subtriangular; the muscular scars are large for the size of the valve, especially the posterior scar; the pallial sinus is deep, high, rounded behind, confluent with the pallial line below.

Length 5.5, height 4.5, max. diam. 2.6 mm.

Habitat: Bermuda.

This shell is perhaps nearest to *Anapella*, which has no pallial sinus and a simpler hinge-armature. I know of no other genus of the family which can be said to approach it more nearly.

A NEW BRACHIOPOD FROM BERMUDA.

BY WILLIAM HEALEY DALL.

Another of Mr. Haycock's interesting discoveries is a small brachiopod belonging to the genus *Argyrotheca* (formerly *Cistella*), which occurs in the shell sand of Bermuda.

ARGYROTHECA BERMUDANA, n. sp.

Shell minute, varying from nearly circular to slightly quadrate-rounded, with a feeble concave median inflection of the hæmal valve which does not obviously undulate the distal margin. Color white, clouded with pale scarlet; area wide, smooth, with a very large triangular opening for the pedicel; surface smooth with rather large punctations. Hinge teeth short, strong. Ventral valve with a median, rather low septum, extending nearly to the distal margin. Hæmal valve with a strong septum, widest distally and with a distinctly serrate front edge. Apophyses broad and horizontally incurved, and in large part free from the valve except near the septum. The largest specimen is 2.5 mm. wide and about as high, moderately convex.

None of the specimens contained the remains of the animal. In form and character this is a very distinct species; in color it may be

compared to *Frenulina pulchella* Gray. It cannot be confounded with the heavily ribbed Antillean *A. rubrotincta*.

A NEW CALIFORNIA EUPLEURA

BY WM. H. DALL.

The following species was dredged off San Diego, outside the kelp beds, in 15 fathoms, by Mr. C. W. Gripp, whose success in getting new and interesting forms is well known to readers of the NAUTILUS:

EUPLEURA GRIPPI, n. sp.

Nucleus small, of a single whorl or slightly more, dark chestnut-brown in color, smooth and slightly tilted, followed by four and a half subsequent whorls, with the inception of which the sculpture changes abruptly; the first has two, the second three, the third four spiral threads between the periphery and the subsequent suture; the two original threads stronger than the others, but all becoming relatively feebler, and on the last whorl obsolete; the posterior slope of the whorls is smooth except for lines of growth; on the last whorl there are very obscure indications of obsolete spiral sculpture; the whorls have, in the type specimen, about five obscure nodes at the shoulder, reminiscent of the varices of the other species of the genus; whorls increasing in size rapidly, the shoulder slope flattish, situated at the posterior third on the last whorl, the suture distinct but not appressed; aperture ovate, the body with a light glaze, the outer lip thickened, sharp-edged, tinged with orange color; the type has eight small denticles within on the callus; canal short, open, slightly recurved; general tint of the type specimen dark, livid, olive color; operculum muricoid.

Height of shell 21.5, of last whorl 18.0, of aperture excluding the canal 10.0; max. diameter of the shell 11.0, of the aperture 6.2 mm.

The animal, like that of the other species, is purpuriferous. It presents a strong contrast to the other species of the genus in its general smoothness and absence of conspicuous sculpture and the bright color of the lip.

NOTE ON PACHYCHEILUS VIOLACEUS PRESTON.

BY CHARLES T. RAMSDEN,
Guantanamo, Cuba.

This species, the largest Melanian of Cuba, was described by Mr. Preston in the Proceedings of the Malacological Society of London, ix, p. 199, March, 1911, the locality being indefinitely given as "Cuba, alt. 2000 feet." The circumstances of the discovery of this remarkable species may be of interest. I found it in the Santa Maria river at Camp Yberia, 2000 feet above sea level, on September 17th, 1909. This place is 25 miles west of the city of Baracoa, on the north coast of Cuba. The hills in which Camp Yberia lies are known as the Sierra del Cupey, and the place is by no means easy of access.

The shells are quite abundant, all being squarely truncated. They are purplish-brown, almost black, with indistinct light bands below the suture, at the periphery and around the axis. These bands show distinctly on looking through the shell from the inside. Or the shell might be described as pale olive, with two broad purple-brown bands. The surface has the fine striation of the Central American species of *Pachycheilus*.

THE USE OF THE GENERIC NAMES UNIO, MARGARITANA, LYMNIUM AND ELLIPTIO, AND OF ANODONTA AND ANODONTITES.

BY A. E. ORTMANN.

Recently an attempt has been made to show that the general use of the old names of *Unio*, *Margaritana* and *Anodonta* is not correct, but that they should give way to *Lymnium*, *Unio* and *Anodontites*, respectively. This was first indicated by Thiele (Nachr. Bl. deutsch. Malakozool. Ges. 41, Heft 1, 1909, p. 29) and carried out by him subsequently (J. Thiele, Mollusken, in: Brauer, Suesswasserfauna Deutschlands, Heft 19, 1909, pp. 32–35).

I. To the first change (*Unio* into *Lymnium*, etc.) an objection was promptly taken by F. Haas (Nachr. Bl. deutsch. Malakozool. Ges. 41, Heft 2, 1909, pp. 68–72), to which, however, Thiele replied, maintaining his view (Beitr. Kenntn. mitteleurop. Najaden, Beil. Nachr. Bl., etc., No. 3, 1909, p. 48).

The evidence offered for either view may be condensed as follows:

The original genus *Unio* of Retzius, 1788, contains species both with and without lateral hinge teeth, and no type is named. In 1792 Bruguière describes the genus *Unio* as possessing such teeth, without saying, however, what is to become of those species which have no lateral teeth. In 1815 Oken divided the genus *Unio*, calling the species with lateral teeth *Lymnium* and those without teeth *Unio*. In 1817 Schumacher did the same, but retained *Unio* for the species with teeth, while for those without teeth he introduced the new generic name *Margaritana*.

Thiele now claims that Oken was the first to *split* the old genus, and that his names have the priority, while Haas claims that Bruguière had the *intention* to split the old genus, and that he thus has the priority over Oken. With reference to the latter claim, Thiele says that there is no evidence whatever in Berguière's paper to show that he intended to divide the genus *Unio*.

Both authors are right. Bruguière *may* have had the intention of dividing the genus, but there is no positive proof of it, and as long as the dispute concerns the possible *intentions* of Bruguière the question will never be settled. But I should like to offer here two suggestions which probably will help us.

(1) *Unio* Retzius is a genus *without a type, but with a diagnosis*, which includes species with and without lateral teeth. No matter what the *intentions* of Bruguière were, the *fact* remains that he, with a full knowledge of Retzius' diagnosis, *gave another diagnosis*, in which he mentions only the presence of lateral teeth. Thus, although we cannot say that the genus *Unio* has been *split* or *divided*, surely the concept has been changed and *restricted*. This is a perfectly legitimate way in nomenclature, and thus Bruguière introduced the first change in the definition of the genus, and consequently has the priority over Oken. Oken, according to our modern rules, had no right any more to use *Unio* in such a way that it would exclude all of Bruguière's species.

(2) *Unio* Retzius is a genus without a type, that is to say we do not know which one of the six species enumerated by Retzius is *the* type. Yet looking again at the diagnosis, we see it says that in "most" species (*in plurimis*) lateral teeth are present. This makes it perfectly clear that Retzius regarded the absence of lateral teeth (in one species) as an exception to the rule, while the other five spe-

cies represent the rule, or typical condition. While we thus do not know the type, we know, on the other hand, *which species should not be the type.*

Now if any subsequent author is to select a type species, this latter surely should correspond to the original diagnosis, and should represent the rule but not the exception. Haas cites a rule of the international code of nomenclature (section 35), which says that no species should be selected as type which has only "doubtfully" been assigned to the genus by the original describer. Of course, taken verbally, this rule does not entirely fit the present case, but without much difficulty it might be stretched so as to cover it. If *U. margaritiferus* is selected as type, as Oken does, a species is taken which is abnormal and does not fully correspond to the original diagnosis, while a number of species which do fit the original diagnosis are thrown out. While Bruguière's change in the diagnosis consists only of the dropping of the word "most" (*plurimis*), thus throwing out the exceptional case only, Oken's definition of the genera involves a complete change, for instead of having lateral teeth "in most cases," as formerly, *Unio* now has "never any" lateral teeth, practically the opposite.

These two considerations are, as far as I can see, consistent not only with common sense, but also with the rules of nomenclature. There is no rule which says that an author has no right to change the concept of a genus by modifying the diagnosis, as long as one or some of the original species remain included, and this is what Bruguière has actually done, and we see it black or white before us. And further, in doing this, Bruguière simply carried out an idea already suggested by Retzius, namely, that the genus *Unio* consists of a number of species representing fully the normal condition of the genus, and of an additional one which forms an exception.

Consequently Bruguière has the priority, and *Lymnium* of Oken becomes simply a synonym of *Unio*, as restricted by Bruguière. For the remaining species (*U. margariferus*) Schumacher's name *Margaritana* is to be used.

I may mention here incidentally that a number of North American species are retained under the genus *Unio* by Simpson. I do not think that they should remain congeneric with the European forms, for reasons which will be set forth in another paper. For most of the American forms the generic name *Elliptio* Rafinesque, 1819,

which has been used by Simpson for a section of *Unio*, will be appropriate, and its use will conform to the rules of nomenclature. The type species of *Elliptio* is *U. crassidens* Lamarck. Congeneric are at least the following species: *gibbosus* Barnes, *complanatus* Dillwyn, *fisherianus* Lea and *productus* Conrad, and probably most of the other North American species, at least those which group with the species named.

II. The substitution of *Anodontites* Bruguière, 1792, for *Anodonta* Lamarck, 1799, has also been advocated by Thiele (l. c.), and is not objected to by Haas (l. c.).

I think this case is absolutely clear, and there is no earthly reason for this change. *Anodontites* was created by Bruguière in order to describe a new species, *A. crispata*, from South America. He also says that several other species belong to *Anodontites*, two of Linnæus, which he names, and seven others which he does not mention. This leaves not the slightest doubt that *Anodontites crispata is the type of Anodontites.* It is the first species described under this generic name, and it consequently always has to remain with this genus unless the latter is dropped for other reasons. In Simpson's synopsis, however, this species stands under *Glabaris* Gray, 1847. This is against the rules. Since there is no objection whatever to the generic name *Anodontites*, *Anodontites crispata* has to stand, and all other species of the modern *Glabaris* have to go with it, so that *Glabaris becomes a synonym of Anodontites*, which is a South American genus. This opens the way for the admission of Lamarck's *Anodonta*, the type of which is, according to Simpson, *Mytilus cygneus* of Linnæus.

We may now rejoice, for we have three valid generic names among the Najades which we must not confuse, *Anodontites* Bruguière (= *Glabaris* Gray), *Anodonta* Lamarck and *Anodontoides* Simpson, disregarding the synonyms *Anodon* Oken, *Anodontes* Cuvier, *Anodontopsis* Simpson and the fossil *Anodontopsis* McCoy.

THE LAND SHELLS OF GARDEN KEY, DRY TORTUGAS, FLA.

BY GEORGE H. CLAPP.

While at Key West last June on the "Eolis," Henderson and I were invited by Dr. Alfred G. Mayer, in charge of the Carnegie Institution Biological Station on Loggerhead Key, Dry Tortugas, to

come over and make a call. As it was only a matter of about 65 miles each way we decided to accept, so the day after their boat, the "Anton Dohrn," started we followed, and spent four delightful days on and around the keys.

Our anchorage was just off Fort Jefferson, Garden Key, and knowing that the Fort had been occupied for a great many years we thought there might be some land shells. A careful turning over of boards, bricks and stones inside the Fort yielded nothing but an occasional scorpion. Finally Henderson climbed to the top of the old magazine, which was covered with a heavy growth of vines and weeds, and almost immediately turned up an *Opeas micra*. We then discovered a *Bifidaria* on the under side of a brick, so gathered a lot of dirt and dead leaves which on picking over yielded the following:

Opeas micra (Orb.). Very common, mostly dead.

Bifidaria rupicola (Say). Not common, many alive.

Bifidaria hordeacella Pils. Common, mostly dead.

A careful search under stones and boards on top of the Fort yielded nothing.

On the beach among drift I picked up four dead, bleached *Polygyra c. carpenteriana* (Bld.) and two immature *Cerion incanum* (Binn.), evidently "floaters" from one of the eastern keys.

A FEW SUGGESTIONS.

BY V. STERKI.

Can the NAUTILUS give a little space for a few suggestions which it is hoped will not be offensive to the readers and collaborators, but meet with approval and—application?

1. The terms "Land and Freshwater Mollusca," or "Terrestrial and Fluviatile," or even "Extra-marine," are somewhat lengthy and cumbersome. We might say "Inland Mollusca" somewhat like the German "Binnenmollusken," and even more expressive. In a short time we should be accustomed to it and find it convenient.

2. The terms "Malacology" and "Malacologist," generally used elsewhere, have been used occasionally also by American writers in preference to "Conchology" and "Conchologist," which date from

the time when the shells, or conchæ, were the things collected and studied. Now we are studying mainly the soft parts; better, the animals, "Malacozoa," and might as well use the proper term. Malacology is a permissible, or excusable, abbreviation of malacozoology.

3. In somewhat the same sense we still are too much accustomed to the word "Shells" used indiscriminately. "Land Shells of North America" or the "Shells of Tennessee" is improper. In the first place we really mean the animals, and in the second there are many snails without any shells. The words "Snails," "Mussels" and "Slugs" are not objectionable, have been used, and their meaning is clearly defined. Restrict the use of "Shell" to what it really means.

4. In looking over the files, *e. g.* of the NAUTILUS, we find scores of heads of articles like, "A New Species of Unionidæ." If the name of the species described were the title we would not only at once know what it is, but it would be easier to find a certain article, and registration would be simplified.

New Philadelphia, Ohio, Sept., 1911.

NOTE ON A NEW ABRALIOPSIS FROM JAPAN.

BY S. S. BERRY,
Stanford University, California.

Preserved among some miscellaneous invertebrates in the Stanford University collections were found specimens of a very distinct and interesting new species of *Abraliopsis*, with respect to which the following notes may be regarded as merely preliminary to a more extended account in a paper now in hand.

Abraliopsis scintillans, new species.

Animal small, mantle elongate conical, tapering; fins large, broadly sagittate, well produced posteriorly to an acute point, about two-thirds as long as the body.

Head large, flattened, with large, prominent eyes.

Arms moderate, nearly of a length, their relative order 4, 3 = 2, 1 (the dorsal arms counting as 1); armed for the most part with 11–12 small alternating hooks, but these give place to two rows of

minute suckers at the tips, except on the ventral pair, which show the usual modifications.

Tentacles as long as the mantle, their clubs not expanded; armed with four rows of small suckers over the distal two-thirds of the club, proximal to these a ventral row of two large hooks opposed by a dorsal row of 4–5 very minute suckers. Fixing apparatus composed of four suckers and four pads alternating in two rows.

Photophores numerous on the ventral aspect of the mantle, bilaterally arranged but not in clearly defined series; on the funnel in about ten rows; on the lower surface of the head nearly as many, including a distinct circlet about each orbit; on the ventral arms three rows, only one of which persists to the tip; on the third arms one short row.

Length of mantle 59 mm., of fins 39 mm., width across fins 38 mm., length of ventral arms 27 mm.

Habitat: Japan.

NOTES.

An Additional Record for Helix hortensis Müll.—Dr. Percy E. Raymond, of the Geological Survey of Canada, has recently sent to the Carnegie Museum 21 specimens of *Helix hortensis* from Neuville, Points aux Trembles, Portneuf Co., about 22 miles west of Quebec. There are 21 shells in the lot, all bright yellow, with the following band formulas:

Six var. *arenicola*, 12345 transparent, 4 and 5 faint.
Three var. *arenicola*, 12345 transparent, 4 and 5 very faint.
Three var. *arenicola* (?), 12300 transparent.
One var. *arenicola*, 12000 traces of 1.2 near aperture.
One, 00000.
One, 12345, young shell, 4 whorls.
Six immature, 4 to 4½ whorls, all showing translucent bands.
Largest shell 22 x 18 x 16½ mm.
Smallest shell 18½ x 16 x 15 mm.—Geo. H. Clapp.

As a small contribution to the discussion in the Nautilus In re the Southern Range of *Epiphragmophora infumata*. I collected a fine living specimen of the typical form in the "Muir Woods," Mt. Tamilpais, in May, 1909. This is in Marin county, and I believe about twenty miles north of San Francisco.—Geo. H. Clapp.

Vallonia in Chicago.—Eleventh month, eleventh day, 1911. Funny date, funny day! Thermometer standing at 72°, wind at 40 miles per hour. Thought I must do something unusual, so at 9 a. m. took my little tin tobacco box and walked to 63d and Prairie Ave., near where the South Side Elevated goes round the bend, and looked for *Vallonias*. About a month ago I captured 1782 in two hours. To-day I returned in an hour, and must have four or five times as many. It may not be news, but they reminded me of white ants, the way they "bored into" the decaying sticks and wood.

I think this is a "record" for collecting so many near the heart of a great city. If any one wishes samples let him speak out.—E. E. Hand, Wendell Phillips High School, Chicago, Ill.

On the Type of Congeria.—The genus *Congeria* Partsch was proposed for four new species of the Hungarian miocene, *C. subglobosa*, *C. triangularis*, *C. balatonica* and *C. spathulata*. No type was selected, and so far as I can learn none has been expressly selected by any subsequent author. Professor Karl von Zittel, in his well-known Handbuch der Paläontologie, figured *C. subglobosa*, and that only as an example of the genus (Vol. I, p. 43, fig. 56), but by some error, such as may overtake even the most careful naturalists, he wrote the name "*Dreissensia* (*Congeria*) *conglobata* Partsch." This error was perpetuated by Dr. Paul Fischer (Manual de Conchyl., p. 973). The same species is mentioned and figured in the English translation of Zittel's Text-book of Palæontology, I, p. 387, fig. 685 (1896), and here the name under the figures is correctly given, *subglobosa* Partsch. The general use of this species as an example of *Congeria* renders it expedient to select it as type. *Congeria subglobosa* Partsch is therefore the type of *Congeria*.

C. subglobosa is very aberrant for a mytilaceous bivalve, being thick, rounded-quadrate, with somewhat the general contour of the deep valve of *Exogyra*. Dr. Dall, to whose work on Pelecypods we naturally turn for such information, considers our American Dreissenids to belong to *Congeria* rather than to *Dreissena*, the common European genus, which he shows to be generically different (Tertiary Fauna of Florida, p. 808). It must be admitted, however, that the American forms by their shape and thinness differ a good deal from the type of *Congeria*, so that the group *Mytilopsis* Conrad

(Proc. A. N. S., Phila., 1857, p. 167) will probably be retained for them, in a subgeneric sense. Its type and only species was *M. leucophæatus* Conr., of the Atlantic coast north to Chesapeake Bay.

Partsch's article appeared in a very rare periodical, and is entitled "Ueber die sogenannten versteinerten Ziegenklauen aus dem Plattensee in Ungarn mit ein neues urweltliches Geschlecht zweischaliger Conchylien," von Paul Partsch, published in Annalen des Wiener Museums der Naturgeschichte, I, pp. 93–102, 1835. *Congeria* is first mentioned and defined on p. 97 (not p. 93, as has been cited).—H. A. Pilsbry.

The Name Glossina.—It is a curious illustration of the wide separation of different groups of zoologists that the name *Glossina* has been permitted to remain in use for a Brachiopod, apparently without protest, while it rightfully belongs to the well-known tse-tse fly, the carrier of the sleeping sickness organism. This double use, contrary to the rules of nomenclature, is perhaps still more objectionable since we discovered the Dipterous *Glossina* in the miocene of Colorado, and the name consequently enters palæontology. Probably those who may have noticed the conflict have found that the nomenclators give no date for *Glossina* Wiedemann, and consequently no certain indication of its priority. It was published, however, in 1830, while the Lingulid *Glossina* Phil. (type *Lingula attenuata* Sowerby) did not appear until 1848. The Lingulid genus or subgenus (Dr. Charles Schuchert writes me that "at present the name cannot have greater value than that of subgeneric rank") may take the name *Palæoglossa*.—T. D. A. Cockerell.

Helix Hortensis on Long Island, N. Y.—Smith and Prime, in their list of Long Island mollusks, 1870, p. 404, reported *H. hortensis* from Long Island, without citing any definite locality. The undersigned will be grateful for any further information. Where on Long Island, or elsewhere in New York, has the species been found, and in what collections are specimens preserved? Similar information on the occurrence in New York of *Polygyra inflecta* Say, *P. appressa* Say and *P. multilineata* Say is desired.—*H. A. Pilsbry*, Acad. Nat. Sciences, Logan Square, Philadelphia.

ARKANSIA WHEELERI, N. SP.

The Nautilus.

Vol. XXV. JANUARY, 1912. No. 9

A NEW NORTH AMERICAN NAIAD.

BY DR. A. E. ORTMANN AND BRYANT WALKER.

Arkansia, n. g.

Shell moderately thick, subrotund to subovate or subrhomboidal, inflated, with full beaks. Disk sculptured with irregular, oblique folds, which are sometimes indistinct. Beak sculpture poorly developed, consisting of two to three double-looped bars, the loops slightly swollen or tubercular, disappearing toward the disk and not continuous with the sculpture of the latter. Hinge well developed, with strong pseudocardinals, a very strong interdental projection in the left valve and well developed, strong, but rather short laterals.

Soft parts: Supra-anal opening separated from the anal by a mantle connection, which is somewhat variable, but rather long (a little shorter to somewhat longer than the anal; the supra-anal is correspondingly longer or shorter; in one case there is a double mantle connection). Mantle edges, between the anal and branchial, drawn together by the gill-diaphragm but not united. Inner edge of anal almost smooth, that of the branchial with papillae.

Outer lamina of outer gills connected with mantle to its posterior end, and thus the gill-diaphragm is complete. Anterior end of inner gills located about midway between the posterior base of the palpi and the anterior end of the outer gills. Inner lamina of inner gills free from the abdominal sac, except for a short distance at the anterior end. Palpi of medium size, subfalcate, their posterior margins connected for about one-third of their length.

Gills with well-developed septa and water-tubes. The septa are rather distant in the male and in the inner gill of the female. The outer gill alone is marsupial in the female, with very close septa. Edge of marsupium with slightly thickened tissue, indicating that it is capable of being stretched out when gravid.

Type: *Arkansia wheeleri* Ortmann and Walker.

ARKANSIA WHEELERI, n. sp. Pl. VIII.

Male and female shells alike. Shell subrotund to subovate or subrhomboidal, inflated, rather thick and solid; dark reddish-brown or black, usually lighter toward the beaks, which in young shells are chestnut-colored; epidermis with a silky luster; beaks very prominent, projecting anteriorly and incurved over the large lunule, their sculpture consisting of two or three double-looped bars, the loops slightly swollen or tubercular; sculpture restricted to the extremity of the beaks, the remainder of the umbonal region being entirely smooth; posterior half of the disk sculptured with irregular, oblique folds, sometimes nearly obsolete, which on the dorsal slope curve upwards, and in front of the posterior ridge are crossed by numerous, irregular, radiating, small folds or wrinkles at right angles to the lines of growth; anterior portion of the disk smooth; anterior margin nearly straight in front of the beaks, then projecting in a regular curve, which continues around the basal margin until it meets the posterior margin at an obtuse angle about one-third up from the base; hinge margin nearly straight; posterior margin slightly curved; posterior ridge not prominent, usually rounded, but sometimes obscurely biangulate; hinge complete; pseudocardinals strong, ragged, in the left valve, two, not strongly differentiated and coalescing along the hinge line, the anterior narrow and parallel with the hinge line, the posterior somewhat wider and heavier and scarcely separated from a strong projection of the interdentum, which is continuous with the lower lateral and slopes gradually to its extremity; upper lateral low, the groove between them deep and extending nearly to the beak; a single, strong pseudocardinal in the right valve with a deep pit behind it to receive the anterior pseudocardinal of the left valve, interdentum cut away to make room for the interdental projection in the left valve; a single strong, but rather short lateral; ligament dark brown; muscle scars not very deep, those of the anterior adductor and posterior adductor large,

those of the anterior retractor and pedal protractor rather small and inconspicuous; cavity of the beaks very deep; nacre usually salmon-colored above the pallial line, bluish-white below (sometimes entirely white) and rather thin, slightly iridescent with a wide, dark prismatic border.

Length (of type) 73.5, height 62, diam. 41 mm.

Types (No. 33754, coll. Walker), from the Old River, Arkadelphia, Arkansas. Co-types in the collections of the Carnegie Museum, the Phil. Acad. of Science, the U. S. Nat. Museum, and Rev. H. E. Wheeler.

The shell characters of this fine species and most interesting addition to our fauna are very peculiar and can be compared only with *Arcidens*, to which genus, *Arkansia*, undoubtedly, is the closest affinity. In general, the external appearance is quite similar, and in both the smaller series of radiating wrinkles and the curved folds of the dorsal slope are very much alike. But *Arkansia* is a much heavier and more inflated shell, with the beaks fuller, more projecting and more anterior, and the strong, oblique folds, like those of *Quadrula plicata*, are peculiarly its own. It differs, also, entirely in the beak sculpture, which is comparatively simple and confined to the extremity of the beak, and is quite similar to that of certain *Quadrulæ*. In hinge characters it differs in having strong, well-developed laterals. In the presence of the interdental process in the left valve and the cutting away of the interdentum in the right valve opposite it, it is related to both *Arcidens* and *Symphynota*.

The smallest specimen examined (in Mr. Wheeler's collection), measures length, 35; heighth, 33, and diam. 23 mm., being almost circular in shape, and looks, externally, very like a young, smooth *Q. pustulosa* Lea, the oblique folds being only slightly evident in the post-basal region.

A very large specimen, also in Mr. Wheeler's collection, measures length, 87; height, 73, and diam. 48 mm.

The structure of the soft parts agrees entirely with that of the subfamily *Anodontinae*, chiefly so the mantle edge and the outer marsupial gill. Unfortunately only sterile females have, as yet, been obtained, but it is hoped and expected that this deficiency will soon be remedied.

We take great pleasure in naming this most interesting addition to our fauna after its discoverer, the Rev. H. E. Wheeler of Arka-

delphia, Ark., who is actively engaged in developing the fauna of Arkansas. The generic name is an abbreviation of the name of its native state.

THE ANATOMY OF THE NAJAD HYRIDELLA AUSTRALIS (LAMARCK) (= DIPLODON AUSTRALIS).

BY A. E. ORTMANN.

Through the courtesy of Mr. L. S. Frierson, I have received the soft parts of a male and a female of an Australian Najad, *Diplodon* (*Hyridella*) *australis* (Lamarck) (see Simpson, Pr. U. S. Mus. 22, 1900, p. 890). Mr. Frierson obtained these specimens from Mr. William T. Bednall, who collected them in Gippsland, Victoria. I also received a shell which agrees well with specimens of this species represented in the Carnegie Museum collections. An examination of the soft parts revealed the following characters:

Anal opening (a) closed above by the connection of the inner mantle edges, without forming a supraanal opening. Closed part about four times as long as the anal opening, *forming a rather broad membrane between the outer mantle edges, and around the anal.* The latter is short, subcircular or slightly subelliptic, and *much shorter than the branchial opening* (only about one-fourth as long). It is separated from the branchial opening by the solid union of the inner mantle edges (m). Inner edge of anal practically smooth, that of the *branchial* (b) with distinct papillae, which stop suddenly in front, thus defining sharply the anterior end of this opening. There is no sign of a coalescence of the two mantle halves at this point. Farther in front, the inner mantle edge is smooth, and becomes indistinct anteriorly.

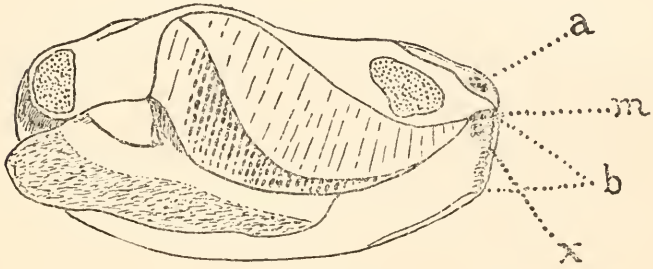
Palpi subtriangular, about as long as wide, with the posterior point not produced. *Posterior margins connected about half their length.*

Gills rather long and wide, the inner the wider, chiefly so anteriorly. Edge of inner gill with a longitudinal furrow, which is absent in the outer gill. Outer gill gradually narrower anteriorly, with its anterior end situated at the highest part of the mantle-attachment-line. Inner gill very slightly narrower anteriorly, with a broad anterior insertion occupying the whole space between the

anterior end of the outer gill and the posterior base of the palpi. However, this gill is not actually connected with the palpi, but its anterior end begins immediately behind the posterior end of the palpi.

Outer lamina of outer gills entirely connected with the mantle; inner lamina of inner gill entirely connected with abdominal sac. Posteriorly to the foot, the two inner laminae of the inner gills are entirely connected, thus forming a diaphragm completely separating the suprabranchial canals from the branchial cavity. This gill-

FIGURE 1.



Anatomy of *Hyridella australis* (Lamark) (female). Side view of soft parts after removal of left half of mantle. *a*, anal opening; *b*, branchial opening; *m*, solid mantle connection between anal and branchial opening; *x*, hole by which the cloacal and branchial chambers communicate.

diaphragm does not extend entirely to the posterior margin of the mantle, and the posterior part of the diaphragm is formed by the bridge (m) which unites the two mantle margins and separates the anal from the branchial opening. *But there is a small median hole* (x) *between the posterior end of the gills and this bridge, connecting the cloacal cavity* (*and anal opening*) *with the branchial cavity.*

In all four gills of the male the two laminae are connected by very faint, distant, and often incomplete and interrupted septa, running in the direction of the gill-filaments. The outer gill of the female, and the most anterior and most posterior parts of the inner gill have the same structure; the rest of the inner gill of the female (its larger middle part) has marsupial structure (see figure), with strongly developed interlamellar connections. In the sterile female at hand, the solid parts are slightly elongated in the direction of the

gill-filaments, and stand in rows, forming interrupted septa and incomplete, intercommunicating water-tubes. Toward the base of the gill the interruptions are short and the interlamellar connections stand close together, resembling almost continuous septa. Toward the edge of the gill the interlamellar connections are more distant, showing a tendency to fall into transverse rows, but these are rather irregular, and in some places an almost reticulate appearance is presented.

The female examined is sterile, and thus nothing can be said about the eggs and glochidia. A slide, belonging to the same species, and kindly communicated by Mr. Frierson, shows vertical cross sections through the inner gill of a female, containing eggs, but no glochidia.

The rest of the soft parts offers nothing remarkable. The foot has a sooty-black color in its distal parts, sharply marked off from the whitish basal parts.

It is evident that this structure agrees to a remarkable degree with that of the South American genus *Hyria*, described previously Nautilus, 24, Jan. and Febr., 1911, pp. 108 and 114): In fact, practically all the essential features are identical. The South American genera *Diplodon*, *Castalina*, and *Tetraplodon* possess the same anatomy, except that in some of them we observe a tendency to form a mantle-connection in front of the brachial opening.

The only differences I am able to discover in the Australian form are: 1. The anal opening is much shorter and approaches more a circular outline, and, at the same time, the united mantle edges form a much broader membrane between the outer edges, and are broader around the anal, so that is is probable that the anal of the Australian species was capable of being stretched out as a tubular "siphon," much more pronounced than in the South American forms; 2. An unusual feature is the hole by which the cloacal cavity communicates with the branchial under the bridge, which separates anal and branchial openings. This hole is clearly seen in both of my specimens, and does not look like an accidental or abnormal condition. I have not seen anything like it in any South American form.

The connection of the posterior margins of the palpi probably is of no consequence; there is great variability in this feature in other groups.

It seems to me that the above differences are important. Of

course their existence in other Australian species should be confirmed. For the present, I think, it is well to separate the Australian form generically from the South American *Diplodon*, or, in other words, we should give to the subgenus *Hyridella* Swainson, 1840, generic rank. This is supported by the fact that *Hyridella* also differs in certain shell characters from the typical *Diplodon*, as has been recognized already by Simpson (l. c. p. 888).

One very important conclusion, however, is now finally established: Simpson's opinion that the Najades of the type of *Diplodon* (*Hyridella*) *australis* are closely related to certain South American forms (typical *Diplodon*), *is fully justified, and there remains not the slightest doubt about this.* The structure of the soft parts of both groups is so similar and so greatly different from the true *Unionidae* of the rest of the world, that *Hyridella*, no matter whether we regard it as a genus or a subgenus, must be placed with the family *Mutelidae* (?) and the subfamily *Hyriinae* (see NAUTILUS 24, March, 1911, pp. 129, 130). *This affinity is of the utmost zoögeographical importance.*

MUSCULIUM DECLIVE, N. SP.

BY V. STERKI.

Mussel rather small, subequipartite, slightly to moderately inflated; beaks not or little anterior, somewhat prominent over the valve margin; the latter, anteriorly and posteriorly, straight or slightly curved, forming the two shanks of a rounded angle between the beaks, of about 130°, the posterior incline placed higher up than the anterior; balance of the outlines rounded without any angles in full-grown specimens; in half-grown and adolescent there is a short truncation at the posterior margin, at right angles to the longitudinal axis, and a similar one at the anterior, somewhat oblique; in young —post-nepionic—specimens, the posterior part of the mussel is shorter and higher than the anterior; surface glossy to waxy, with very fine (microscopic), sharp, crowded, concentric striæ, and usually one or two lines of growth, and faint, irregular radial markings; shell thin, transparent to translucent; color light amber, to somewhat grayish or brownish in old specimens; hinge rather long;

left posterior cardinal tooth rather long, curved, the anterior small, sharply pointed, strongly curved upward, corresponding with an excavation below the right cardinal; laminæ ["laterals"] comparatively stout, the anterior of the left valve markedly projecting inward; ligament rather long; long. 7, alt. 6, diam. 4 mill.; soft parts not examined; Justice Latchford writes that the mussel "is of a bright chrome yellow when fresh, and seems to be unlike any other."

Distribution: Blue Lake, Muskegon Co., Michigan, collected and sent by Dr. R. J. Kirkland in 1899—the type lot, No. 1697 of my collection of *Sphæriidæ;* Pine Lake, Marquette Co., Mich., collected by Mr. Bryant Walker in 1902; Gorman Lake, Renfrew Co., Ont., collected by H. Justice F. R. Latchford in 1911. From the two last named places the specimens are considerably smaller, slighter, and little inflated, the nepionic shell is smaller, and in some specimens barely or not marked off (æstivale form).

This is a clearly distinct and well-marked species, apparently ranging nearest *M. rosaceum* Pme. It should be looked for at other places, and especially fossil, in marl deposits, etc.

COLLECTING FROM HADDOCK ON THE GEORGE'S BANKS.

BY W. F. CLAPP.

Many malacological students believe that shells taken from fish stomachs have no practical locality. It has been argued that it would be an easy matter for a haddock to change it's position 150 miles in 24 hours. It is possible that a fish may retain its food that length of time. Therefore a shell, found in a haddock caught near Cape Cod, may have been in Nova Scotia waters the day before. This of course would apply only to those shells which had passed through a considerable portion of the intestines, for one is sure of the habitat of a shell in proportion to the distance it has traversed the digestive tract. I believe that Gould and other authors who have described shells found in fish, intend the word stomach to include the entire alimentary canal. Less than 5 per cent. of the shells I have found in fish came from the stomach proper.

My object in writing this note is merely to show plausible reason for placing more confidence in fish-stomach localities. Under certain conditions I believe them to be fairly accurate.

On November 20, 1911, I examined the contents of nearly 1000 fish caught in "Cove Clark," Georges Bank, lat. 41.18 N., long. 68.40 W., in 60 fathoms. This locality is known to fishermen as a "spaghetti" spot, on account of the great masses of worm tubes found on the muddy bottom. These worn tubes accumulate in such quantities that it is almost impossible to use a beam trawl successfully. I obtained several hundred specimens of Yoldia, Nucula and Leda from haddock, also quantities of the worm tubes, but no gasteropods. The dredge produced the same results with the addition of *Cyrtodaria siliqua* Daudin and *Panomya norvegica* Spengl. to the Molluscan fauna of this spot. It contained even a greater proportion of the worm tubes. The similarity of the mass of animal life and mud obtained from the fish stomachs to that obtained from the dredge was very noticeable.

On November 21 the position of the vessel was changed to a station about ten miles to the eastward. The depth here was about 40 fathoms, the bottom coarse gravel and there were no worm tubes. The first haddock I examined from this new locality contained about 50 shells, nearly all of which were gasteropods. I examined over 500 haddock during the day and at dark had filled a ten-quart pail with Mollusca.

The dredge was set six times during the day and the contents compared in a surprising degree to the contents of the fish stomachs, not only in Mollusca but in other phyla. Not one specimen of Yoldia, Nucula or Leda could I find in either the dredge or the fish, and yet ten miles to the eastward I had obtained plenty of all three, from the haddock stomachs and from the dredge.

There is nothing definite in these observations. I do not insinuate that all haddock-stomach localities would be as accurate as these appear to be. It is only by recording an observation of this kind that we can ever hope to arrive at definite knowledge on the subject. I merely suggest the possibility that fish-stomach localities are more accurate than most of us have generally supposed.

The following species were removed from haddock November 20 and 21, Lat. 41.18, Long. 68.40 W.

Puncturella noachina Linn.
Margarita cinerea Couth.
Solariella obscura Couth.
Scala groenlandica Perry.
Amauropsis helicoides Johnston.
Polinices heros Say.
triseriata Say.
immaculata Tott.
nana Moll.
Natica clausa Brod. & Sowb.
Marsenina glabra Couth.
Trichotropis borealis B. & S.
Crepidula plana Say.
Mesalia erosa Couth.
Aporrhais occidentalis Beck.
Couthouyella striatula Moll.
Nassa trivittata Say.
Chrysodomus decemcostatus Say.
Sipho stimpsoni Morch.
pygmaeus Gould.
Buccinum undatum Linn.
Admete couthouyi Jay.
Bela incisula Verr.
cancellata M. & A.
gouldii, Verr.
pleurotomaria Couth.
nobilis Moll.
harpularia Couth.
decussata Couth.
bicarinata Couth.
bicarinata, var. violacea M. & A.
rosea Sars.
concinnula Verr.
Cylichna alba Brown.
Retusa gouldii Couth.
Philine quadrata S. Wood.
lima Brown.
Dentalium entalis Linn.
Nucula tenuis Montg.
proxima Say.
Leda tenuisulcata Couth.
Yoldia limatula Say.
sapotilla Gould.
Solemya velum Say.
borealis Tott.
Anomia simplex d'Orb.
Mytilus edulis Linn.
Modiolus modiolus Linn.
Modiolaria corrugata Stimp.
Crenella glandula Tott.
decussata Montg.
Pecten islandicus Muller.
magellanicus Gmel.
Venericardia borealis Conrad.
novanglii Morse.
Astarte castanea Say.
quadrans Gould.
subaequilatera Sowb.
Cyclas islandica Linn.
Thyasira gouldii Philippi.
Macoma calcarea Gmelin.
Spisula solidissima D'Ilwyn.
Cardium pinnulatum Conrad.
ciliatum Fabr.
Siliqua costata Say.
Saxicava arctica Linn.
Cyrtodaria siliqua Daud.
Thracia truncata M. & A.

For a more definite knowledge of the fauna of the "Georges' one should consult the excellent paper by S. I. Smith and O. Harger, "Report on the dredgings in the region of St. George's Banks" (Trans. Conn. Acad., III, pp. 1–57, 1876).

LYMNÆIDÆ OF AROOSTOOK COUNTY, MAINE.

BY OLOF O. NYLANDER.

In recording some additional notes on the Lymnæidæ of Aroostook County, I have followed Mr. Frank Baker's valuable work on the Lymnæidæ of North and Middle America. *Galba umbilicata* is the *Limnæa humilis* and *G. obrussa* the *L. desidiosa* of my previous lists.

Galba umbilicata C. B. Adams. Fine specimens of this species were common in damp places and ditches along the roads in Caribou and surrounding towns.

Galba obrussa Say. This variable shell is common in the Aroostook River. The following varieties are most prevalent:

Galba obrussa peninsulæ Walker. Specimens were collected in the southeastern part of the town of Castle Hill, in wet places along the road.

Galba obrussa exigua Lea. Common on rocks at low water in Aroostook River. Many colonies were found in Caribou stream, and some are exceedingly variable, hardly two specimens being exactly alike.

Galba obrussa decampi Streng. A common fossil in the marl deposits of Aroostook County. Living specimens were found in a small brook, tributary to the south branch of Caribou stream in Woodland and in Salmon brook.

Galba emarginata Say. Many colonies were found in Fish River.

Galba emarginata mighelsi W. G. Binney. Square Lake, Cross Lake, Eagle Lake and Portage Lake, all on the Fish River. The specimens from Square Lake are typical of this variety, and are the largest and finest specimens known.

Galba oronensis Baker. A large colony of this species was found in Caribou village where the Caribou stream enters the Aroostook River. The specimens were found on rocks at low water. The color of the animal is bluish-black or mouse color.

The Caribou stream is full of rubbish from the starch factories, saw-mills and grist mills, and the refuse of the village which furnishes the *G. oronensis* with abundance of food. There is one potato-starch factory about three hundred feet from the shells, and sometimes the colony is nearly covered with the refuse from this

place. I have examined the river for many miles, but have never found any of the shells elsewhere.

NOTES ON PHYSA GYRINA.

BY A. A. HINKLEY.

A small spring, the basin of which has been dug to the depth of three feet or more and walled with rock to the surface of the ground, has been the home of *Physa gyrina* for many years. The water spreads out some as it leaves the basin and then drains into a ditch nearby.

Until this year, this colony has been nearly typical of the species. On April 28th I noticed that there was quite a number of good-sized shells around the borders of the basin, and on examining them was surprised to find an unusual roughened or malleated surface amounting to folds and humps on some individuals. The roughened surface was confined to the last stage of growth, which rarely extended back much over half the whorl. On this date egg-masses were numerous on and under leaves, which were in the shallow water. All mature shells I could find were taken for my cabinet.

On May 8th a few more mature shells were found, at this time most of the eggs had hatched and the minute shells were very numerous.

November 26th a visit to the spring in the morning surprised a pair of kildee plovers feeding in the shallow water, no *Physa* were visible around the borders, a few were found under leaves, but the shells could be seen on the bottom of the basin, and where the water issues from the rock they were piled up several deep.

Afternoon I returned with a net and took some fifty of the largest, most of these have two callus deposits or bands, and a few three; these bands are not the same on any two shells, they may be close together or half a whorl apart, the last one may be the borders of the outer lip or as far as one-fourth of a whorl back. The lines of growth may be a little stronger than usual, but none of these shells show the roughened surface of those taken seven months ago. It will be interesting to see what develops by the time the year is past.

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NOTES ON THE VARIATION OF STROMBUS PUGILIS.

BY CHARLES W. JOHNSON.

A large series of *Strombus pugilis* Linné, with its varieties *alatus* Gmel. and *nicaraguensis* Fluck, together with its Pacific analogue, *S. gracilior* Sowb., and their Oligocene precursors, *S. proximus* Sowb. and *S. pugiloides* Guppy, form a very interesting group for studying the evolution and variation of a species.

Young specimens (lacking the body whorl) differ even more in general appearance than the adults. The apices of most specimens are usually wanting, but a young example of the typical form and one of the variety *alatus*, in the collection of the Boston Society of Natural History, show the following differences: In *pugilis* the *first* two whorls are entirely smooth; the *third* with obsolete longitudinal ribs; the *fourth, fifth* and *sixth* with prominent ribs and two or three varices to each whorl, but without spiral lines; *seventh* with ribs, spirals and varices; *eighth* nodulose, with a varix and prominent spirals; *ninth* nodulose, with prominent spirals; *tenth* with coarse spirals and fine intermediate lines; the row of nodules are almost covered by the following whorl; the *eleventh* (preceding the body whorl) has long spines at the periphery, a few spirals below the suture and at the anterior half, the remainder of the whorl being smooth; length of specimen 42 mm.

In the specimen of *alatus* the protoconch is broken, but a part of the third whorl would indicate two smooth whorls, as in *pugilis;* the

fourth whorl has some obsolete longitudinal ribs and spiral lines at the base; the *fifth*, *sixth* and *seventh* have prominent longitudinal ribs and spirals, without varices; *eighth* with similar sculpture and one varix; on the *ninth* the ribs and spirals form slight nodules at the shoulder, with one varix; *tenth* subnodose with coarse spirals; *eleventh* subnodose with coarse spiral ridges and fine intermediate lines covering the entire whorl. Length 49 mm.

Though larger, it is apparently the same age as the specimen of the typical form. Whether the above characters will prove to be constant I cannot say. The typical form seems to assume the larger spines of the adult one whorl in advance of the variety *alatus*. The variety *nicaraguensis* is smaller than either *pugilis* or *alatus*, and the spiral ridges usually cover the entire body whorl of the adult shells. *S. gracilior* loses its spirals much earlier than *S. pugilis*.

In the adults there are some marked variations both in color and form. The typical *pugilis* is less variable in color, ranging from an orange-yellow to carnelian-red; *alatus* varies from white to purple, and from a purplish brown to deep orange or carnelian-red. Externally *pugilis* is usually a uniform yellowish brown, while *alatus* varies from a light yellow to a dark brown, the latter color often disposed in bands or zigzag markings; *nicaraguensis* is of a uniform dark salmon color.

The length and shape of the spines vary in both forms. A figure in Chemnitz (Conch. Cabinet, X, tab. 196, f. 1493), shows the rows of spines at the periphery; the two united would give the broad, vertically compressed spines as figured by Chenu (Manuel Conch., I, p. 225, fig. 1582). In the many specimens which I have examined I have never seen these forms; they probably represent unique abnormal specimens. Tryon is wrong in making the *non-spinose* form of *alatus* typical. The figure referred to by Gmelin (Conch. Cabinet, III, tab. 91, f. 894) is the common brown form of Florida, with a row of subacute tubercles on the body whorl. Lamarck, under *S. pyrulatus*, refers to the same figure. Specimens of *alatus*, in which the tuberculate spines are entirely wanting, are not common, only about five or ten per cent. I found the greatest number at Marco, Florida. A spineless form of *pugilis* has also been recorded. A specimen in the Boston Society's collection has the spines wanting in the greater portion of the body whorl, as figured by Knorr, III, tab. 16, fig. 1.

LAND MOLLUSKS OF GARRETT COUNTY, MARYLAND.

BY WITMER STONE.

While the writer is not a conchologist, he has for a good many years been picking up such land snails as came in his way in the course of field work in other branches, and submitting them to Dr. Pilsbry for the collection at the Academy of Natural Sciences, at Philadelphia. With an experience limited mainly to the eastern half of Pennsylvania and southern New Jersey, where snail shells are conspicuous by their scarcity and small size, his enthusiasm for conchology did not rise to a very high pitch, and it is therefore not surprising that his first experience in a region where land snails really did thrive and multiply impressed him not a little.

The first visit to Garrett county, Maryland, was made in June, 1907, in company with Messrs. Bayard Long and Thomas D. Keim. We stopped at the little lumber village of Jennings, as the guests of Mr. Herman Behr, who was in charge of the timber operations, and who gave us every possible assistance in carrying on zoölogical and botanical collecting, and whose personal knowledge of the country and its flora and fauna was invaluable.

Jennings is located near the head of the Castleman River, a branch of the Youghiogheny, which flows down into Somerset county, Pa., directly north, and is bounded on the east by Meadow Mountain and the west by Negro Mountain, 2000 to 3000 feet elevation, the former being the watershed between the Potomac and Ohio drainage. Castleman River is lined for a good part of its course with rocky woodland of hemlock, sugar maple, beech, birch, oak, etc., much more varied in character and with a larger percentage of hard wood than the primeval forests of the central Pennsylvania mountains. These woods are often dark and damp with quantities of loose stones and rocks forming their floor, partly covered by moss and low herbs, but with numerous miniature caves and passages extending down among them, and old moss-covered tree-trunks here and there in all stages of decay. During the two days of our stay there was an almost constant drizzling rain, which, however unpleasant it might have been for collectors, was ideal weather for snails. They simply swarmed on old stumps, logs, rocks, and even on the stems and leaves of herbs and low shrubs. A modest tin box brought along

for the accommodation of casual snails and other lower forms of life was soon filled to the brim, then a couple of handkerchiefs knotted into loose bags accommodated a quart or so, until it became evident that the size of the catch was only a question of the time at our disposal, and attention was directed to other fields.

A second trip of a week's duration was made to Jennings in August, 1911. The weather was clear, and this fact, together with the heat of midsummer, drove the snails into subterranean retreats, so that they did not seem so numerous, although a good series was obtained and more attention directed to the smaller species, yielded a number of forms not secured in the first trip.

Vitrea carolinensis, a species of the southern Alleghenies, was obtained at Jennings, extending its known range very materially to the northward; also *Mesomphyx laevigata monticola*, a southern Alleghenian shell already known from a little farther north in Pennsylvania. *Vitrea ferrea*, of boreal distribution, not known south of the Pocono Mountain in Pennsylvania and Ohio, so far as I am aware, was also secured.

While these species are interesting to a student of geographic distribution and coincided nicely with similar cases of range among the birds and plants, the big Polygyras were what really appealed to me.

In eastern Pennsylvania *P. thyroides* is the only land shell of any size that is generally distributed, though favorable localities yield moderate-sized *P. albolabris*, and towards the mountains we come upon an occasional *Omphalina cuprea*. But here at Jennings we had an abundance of good, big *P. albolabris*, as well as of *P. profunda*, *P. zaleta* and *P. dentifera*, and now and then the northern *P. sayana* and *P. palliata*, together with a dozen species of medium size, only four of which are found in eastern Pennsylvania.

My first collection was placed in a wooden cigar-box in order to keep them alive, and next morning I had the pleasure of seeing them festooning the bureau and looking-glass in my bed-room, long, slimy trails marking their line of escape. The combined strength of the big fellows had been enough to topple the weight off the lid and so enable them to force their way out.

I am greatly indebted to Dr. Henry A. Pilsbry and Mr. E. G. Vanatta for identifying my material, all of which is now in the collection of the Academy. A list of the species follows, as it seems important in view of the rapid deforestation of this country, to pre-

serve records of the relative abundance of all forms of life where primeval conditions still remain :

Polygyra tridentata Say. Common.

Polygyra fraudulenta Pilsbry. Frequent.

Polygyra profunda Say. Common.

Polygyra sayana Pilsbry. Three examples.

Polygyra albolabris Say. Common, but no specimen of variety *dentata*.

Polygyra zaleta Binney. Common.

Polygyra dentifera Say. Common.

Polygyra palliata Say. Frequent.

Polygyra monodon fraterna Say. Frequent.

The Polygyras were most abundant in damp, dark woodland. Curiously enough, I found not a single specimen of *P. thyroides* or *P. hirsuta*. The former has been taken by Mr. S. Brown at Laurel Ridge, Somerset county, Pa., and the latter at Ohio Pyle, Fayette county, Pa. Possibly they do not push so far back into the mountains as the other species.

Bifidaria corticaria Say. Eight specimens.[1]

Bifidaria contracta Say. Two specimens.

Vertigo gouldii Binney. Eighteen specimens.

Circinaria cancava Say. Common.

Omphalina cuprea Raf. Common.

Mesomphyx inornata Say. Common; most frequent on dead leaves on the floor of the forest.

Mesomphyx laevigata monticola Pilsbry. Three examples.

Vitrea indentata Say. Twelve specimens.

Vitrea carolinensis Cockll. One specimen.

Vitrea multidentata Binn. Two specimens.

Vitrea ferrea Mse. Four specimens.

Vitrea milium Mse. Two specimens.

Zonitoides arborea Say. Common.

Gastrodonta intertexta Binney. Several.

Gastrodonta ligera Say. Frequent. This and the preceding seemed to be most abundant in open sugar-maple groves.

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[1] Mr. Vanatta kindly sifted a quantity of dirt and leaves, collected for *Pupidae*, etc., and the actual number of specimens of these minute species obtained from it are given as a possible indication of their abundance.

Philomycus carolinensis Bosc. Common.
Pyramidula alternata Say. Common, especially on tree-trunks.
Pyramidula perspectiva Say. Common on fallen logs.
Helicodiscus parallelus Say. Two specimens.
Carychium exile Lea. Three specimens.

OPEAS GRACILE (HUTTON) IN THE UNITED STATES.

BY HERBERT H. SMITH.

During a hurried collecting excursion in the outskirts of Mobile (low land near the river) I found a single specimen of *Opeas gracile.* The Museum of the Geological Survey of Alabama has three lots of this species, all collected near Mobile, respectively by Dr. E. R. Showalter, Dr. Charles Mohr and Mr. H. P. Löding. It appears to be rather common, at least in the immediate vicinity of the city. Dr. Pilsbry's list of localities (Man. Conch., XVIII, pp. 198, 199) shows that it is found all around the Caribbean Sea, on both sides of Cuba and Santo Domingo and on the Gulf coast of Mexico. Whether or not it is indigenous on the Alabama coast remains to be seen. It is a shore species, hardly ever found more than a mile or two from the sea, and it might easily be transported on timber which has lain on the beach, or in ballast. On the other hand, it should be remembered that we know very little of the land-snails living on or near our Gulf coasts. The question of a recent or older introduction of this species can only be settled when we have studied the Alabama coast region thoroughly ; if it is a recent introduction, its range must be limited to the immediate vicinity of Mobile and perhaps the upper bay ; if it is older it will, no doubt, be found on the low lands of Baldwin county, and in Florida.

Not feeling quite sure of my determination, I sent specimens of the shell to Mr. Bryant Walker. In a recent letter he says: "It is *Opeas gracile* Hutt. as you suspected. There are no published U. S. records that I know of, but last spring, when I was in Charleston, S. C., Mr. W. G. Mazyck gave me some that he had collected there and said it was very abundant in that one locality." In this case it seems very probable that the species has been introduced by commerce.

Museum of the Geological Survey of Alabama, Sept. 5, 1911.

NOTE.—Under the synonymous name *Stenogyra subula* Pfr. this species was reported from Mobile by W. G. Binney, Manual of American Land Shells, p. 426, noted in Man. Conch., vol. 18, p. 199.

O. gracile was taken by Mr. C. T. Simpson and myself on Key West in 1907. It is particularly abundant in the cemetery. It was not found by us on the other Keys, and did not turn up in the copious collections made by Mr. Moore in the Ten Thousand Islands. It seems likely, therefore, that the species was introduced by commerce at Key West and Mobile. Binney also speaks of it as "introduced."—ED.

DRIFT SHELLS FROM TEXAS.

BY V. STERKI.

Mr. Bryant Walker has kindly sent me a portion—about half a pint—of fine drift siftings, gathered from the Paluxy Creek, at Glenrose, Somervell Co., Texas, southwest of Fort Worth. It contained a large number of mollusk shells, of various groups, many of which are interesting with respect to distribution, or systematics, or both, as the list will show.

Zonitoides arboreus (Say), a few, juv. and immature.

Z. minusculus (Binn.), numerous and variable; mainly two forms: one with the whorls narrow and the umbilicus very wide, especially by the last whorl receding outward towards the aperture, and even ascending above on the penultimate; the other with the whorls wider and the umbilicus narrower. Beside these, there are a few specimens very small, with narrow whorls.

Z. læviusculus (St.), numerous, but few specimens full-sized.

Z. singleyanus (Pils.), var., numerous, somewhat variable.

Z. nummus (Van.), about 40.

Z. milium (Mse.), about 30.

Vitrea indentata (Say), a few dozen, juv. and half-grown.

V. dalliana roemeri (Pilsbry), about a dozen.

Helicodiscus lineatus (Say), a few.

Punctum pygmæum (Drap.), about 150.

Strobilops affinis (Pils. or near), mostly juv. and adolescent, few mature.

Bulimulus dealbatus mooreanus (W. G. Binn.?), a few juv.

Polygyra, a few juv.

Pupoides marginata (Say), about 30 or more, juv.; generally small (larger specimens probably retained on the sieve).

Bifidaria corticaria (Say), two.

B. tappaniana (Ad.), numerous; part are quite small and low (f. *curta*).

B. pentodon (Say), numerous and somewhat variable; generally small.

B. pentodon floridana (Dall), a few and intermediate forms.

B. holzingeri (St.), one.

B. procera (Gld.), about 60.

B. duplicata (St.), new, abundant; somewhat variable as to size; brown to light horn to colorless (albino).

This *Bifidaria* has been known for many years, but was not published. It is much like *B. procera cristata* Pils., averaging slightly smaller, but differs mainly by its parieto-angular lamella, being always long and complex, while that of *cristata* is shorter and apparently simple, and it ranges nearer *procera* than *cristata* does. The latter is known from New Mexico and Arizona, *duplicata* from New Mexico to Texas (southwest, south and north) to Kansas. Among the present material not one specimen was seen which even approached *cristata*. More details in regard to the relations of these and other *Bifidariæ* of the group will be given elsewhere.

B. hordeacella (Pils.), abundant; mostly of the typical form, but somewhat variable; some specimens quite small with fewer whorls; a few are albinos. One specimen is reversed (sinistrorse).

B. contracta (Say), abundant, with little variation.

B. armifera (Say), a few juv. only.

Vertigo milium (Gld.), 2.

V. rugosula (St.), one; known from Florida to southern Texas.

Carychium exiguum (Say), about 20.

C. exile (Lea).

Lymnæa (*Galba*) *parva* (Lea?), a few.

Lymnæa (Sp.), one, juv., very small.

Planorbis parvus (Say), a few dozen.

P. carus Pils & Ferr. (?), 2 juv.; somewhat like *parvus*, but smaller

and more depressed [not *umbilicatellus* Ckll.]. These are fresh, while all *parvus* are chalky.

P. bicarinatus (Say), one juv.

Physa, a few juv., very small, apparently of a small and slender form.

Helicina, probably *orbiculata* (Say), juv. only. Two opercula of an *Amnicolid.*

Paludestrina diaboli (Pilsbry).

Pisidium limatulum (St.), one, immature; known from Alabama and Mississippi.

P. singleyi (St.), one adult and one juv.; known from Alabama to Mexico.

Eupera singleyi Pils. (?), one puerile, somewhat different from the southern Texas; less inflated, beaks pointed.

Remarkable is the abundance of some *Bifidariæ* compared with the scarcity of others and of *Vertigo;* also the total absence of *Vallonia.*

Drift material is a valuable asset for faunal studies, giving "pointers," and should be carefully collected wherever possible. It might be suggested, by the way, that not too fine a sieve or strainer should be used, one of about six meshes to the inch, although the siftings may become rather bulky.

But then local collecting should be done in order to have the species and forms from their several habitats, the specimens fresh, with the soft parts, for studying their relations. In the present instance this would be desirable especially with respect to the small *Zonitidæ*, which appear to need a careful revision on good material from many places.

To Dr. Pilsbry I am indebted for the identification of some species.

NOTE ON THE OCCURRENCE OF A GIANT SQUID OFF THE CALIFORNIA COAST.

BY S. S. BERRY.

Outside of Alaska the largest species of squid which has heretofore been recognized from the Pacific Coast of North America is the *Dosidicus gigas* (d'Orbigny), which ranges north at least as far as

Monterey, and is in proper season a fairly frequent inhabitant of the waters just off shore, attaining a length of four or five feet. It is with considerable interest, therefore, that I have recently received information from Dr. C. H. Gilbert, of Stanford University, regarding the occurrence of a much more formidable species, as represented by a single specimen found dead and floating on the surface of Monterey Bay by some of the Monterey fishermen in June, 1911. The monster was brought to shore and dragged up on the wharf, where it was measured by one of the men receiving fish and cast back into the water. He reported that its dimensions, inclusive of the tentacles, were over thirty feet. The animal was in very bad condition, there was no color left, and the epidermis had all sloughed off. Unfortunately, Dr. Gilbert was not at Monterey the particular day that the creature came in and did not himself see the specimen, so no attempt was made to preserve any portions whatever for purposes of identification. Although it would be fatuous to hazard a suggestion as to what species was here represented, we can at least affirm that it was most certainly not *D. gigas*.

Of course newspaper and magazine accounts of off-shore encounters with even more titanic monsters than this one are frequent enough, but from the nature of the case it seems worth while to place even the most meager facts on record whenever any really definite data are to be obtained.

Stanford University, October 8, 1911.

A NEW PLANORBIS FROM MICHIGAN.

FRANK C. BAKER.

Mr. Frank Smith, Associate Professor of Zoology of the Illinois State University, recently submitted some molluscan material for identification, collected in Douglas Lake, Cheboygan county, Michigan. Among the Planorbis is one form which seems to have been unnoticed, and which is easily separable from all other forms. It may be described as follows:

PLANORBIS CAMPANULATUS SMITHII nov. var.

Shell discoidal, solid, the aperture sinistral; periostracum light

horn colored, frequently stained reddish from the iron oxide in the water; surface shining, lines of growth very heavy, more or less rib-like, equidistant; spiral lines absent or very faint; whorls $4\frac{1}{2}$, closely coiled; spire flat, or a little convex, all but the last whorl coiled in the same plane; umbilicus wide and deep, somewhat funnel-shaped, exhibiting two and one-half whorls; the whorls are sharply carinated above and below, the last whorl being particularly so marked; this carination of the whorls causes a flattening of the periphery; the last whorl at a point about midway suddenly bends upward, causing the aperture to be elevated half the diameter of the whorl above the spire, and also causing the umbilicus to form a crater-like contour when viewed laterally; aperture campanulate, wider below and angled above; the sutures are distinctly marked, even channeled in some specimens; outer lip sharp; inner lip appressed to body whorl, which is covered with a callus.

Height of last whorl	Greatest diameter	Least diameter	Aperture height	Aperture breadth
9.00	17.00	12.50	9.00	6.50
8.50	16.75	13.50	8.50	8.50
8.00	15.00	11.75	7.00	6.00
7.50	18.00	13.50	8.50	8.00

This was at first thought to be Dall's *rudentis*, but by a comparison with his description[1] and with specimens believed to be authentic, it was seen to be quite different. The spire of *rudentis* is flat and *elevated* above the last whorl, forming, as observed by Dall, an aspect like a miniature coiled hawser. In *smithii* the spire is depressed and more or less funnel-shaped. In *rudentis* the last whorl is *deflected*, being on a plane or a trifle below the base of the shell, while in *smithii* the last whorl is elevated far above the plane of the spire. The umbilical region is also very different in *smithii*. The sharply carinated whorls also afford a striking difference. Typical *campanulatus* is smaller, the whorls are usually coiled in the same plane and the whorls are rounded and not sharply angulated. *P. smithii* was at first thought to be a good species, but the presence of the typical form in the lake, which shows marked variation toward the *smithii* type, leads to its restriction as a strongly marked variety.

[1] Alaska Moll., p. 90.

Over 200 specimens of the new variety have been examined and its novelty seems constant. Both *rudentis* and *smithii* represent extremes of variation of a common type. It is named in honor of Professor Frank Smith, who collected the specimens.

NOTES.

Polygyra clarkii bradleyi n. var. Similar to typical *clarkii*, but lacks the basal tooth. It has the base malleate but without strong radial sculpture.

Alt. 10.5, diam. 14 mm.

Locality: Black Rock Mt., Rabun Co., Georgia. Type in the collection of the Academy of Natural Sciences, no. 104800. Named in honor of the collector, Dr. J. Chester Bradley. Figured on plate VIII, to appear next month. E. G. Vanatta.

Maine Pearls.—Fresh-water pearls are obtained in Maine, as far as I know, exclusively from *Margaritana margaritifera* Linné. Eight or nine years ago this noble mollusk was abundant in the small streams about my home at Buckfield, Maine; but its numbers have since been regrettably thinned by the ravages of pearl-hunters. Probably, however, it will not be exterminated, since some individuals will remain in hidden and inaccessible situations.

I have found pearls rather copiously while collecting large mature shells for specimens; but most of them were dull or leaden-colored. The largest shells found exceeded six inches in length.

I recently conversed with a carpenter of Turner, Maine, who has hunted pearls in his spare time. He did not destroy the clams indiscriminately, as is done by the more ignorant and reckless pearl-hunters, but only opened those which indicated by some external malformation the probable presence of a pearl. He said that many of the clams lived buried completely below the surface. These were imbedded in the sand at the bottom of the brook and covered by a layer of mud of vegetable origin perhaps six inches thick.

He found one very large and fine pearl, spherical, "about as big as a marble," in a conspicuously deformed shell. This brought him $400, and it may be presumed that the ultimate purchaser paid a considerably larger sum for it.—John A. Allen.

THE NAUTILUS.

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THE MOLLUSCA OF MONTE SANO, ALABAMA.

BY H. E. WHEELER.

Monte Sano is one of the most picturesque spurs of the Cumberland Plateau. It is situate in Madison County, Alabama, just east of the Huntsville meridian, and rises nearly 1000 feet[1] above the valley in which the city of Huntsville lies.

Going east from the heart of Huntsville the pike first crosses a ridge known as Little Mountain, the home of many a choice shell, and then winds its way up the noble brow of Monte Sano, and around to its eastern slope, giving an all-around view of the splendid valleys below from the south and west to the north and east. From the city the distance is nearly five miles. On account of its salubrious climate it is far famed as a summer resort.

In all this limestone region many "Big Springs" are to found. They issue from large caves, or rise from the foot of a bluff, continuing oftentimes on the surfaces the course of subterranean creeks, perhaps connecting some of the smaller rivers at their sinks with the Tennessee River which is but ten miles distant from Huntsville on the south. These springs furnish the coldest water in the state. The valleys of the table lands are the work wholly of erosion,[2] and

[1] The elevation of Monte Sano is given on the topographic sheets of the U. S. Geological Survey as 1600 feet.

[2] See McCalley, Valley Regions of Alabama, I. p. 14 seq.

are everywhere developing many deep and shaded coves, which for the trained collector are a thing of beauty and a joy forever.

The mountain streams of north Alabama flow through a region as attractive to the tourist as it is fascinating to the collector. Who knows what knowledge lies buried in the dashing waters of Hurricane Creek, or waits some intrepid wader in the numerous shoals of Flint and Paint Rock rivers?

Monte Sano is already a classic collecting ground. Years ago it was made famous by its subcarboniferous fossils, and many a botanist has climbed with eagerness its precipitous slopes. Here the curious Chittamwood (the Great American Smoke Tree)—*Cotinus cotinoides* (Nutt.) Britton, whose type locality is the Grand River, Arkansas, finds a congenial home.[1] It is not improbable that it was rediscovered by Buckley on this very mountain.

But to the conchologist Monte Sano is chiefly interesting as the type locality of three land shells, all of which were introduced to science by that indefatigable naturalist, Professor Herbert H. Smith, whose versatility of mind, keenness of vision, and scientific caution universally commend him.

Carychium nanodes Clapp,[2] is one of the smallest, if not the smallest, of all land shells. It prefers the damp woods, hiding between half-decayed leaves in sheltered situations, near the mountain top. *Vitrea lewisiana* Clapp,[3] is still to be considered one of our rarest shells. The yellow animal is clearly visible through the thin white shell, and when crawling on the under surface of the dull-colored rocks, which it seems to prefer, makes a most pleasing picture. *Polygyra smithii* Clapp,[4] has a very evident fondness for mud and clay. Even when it shows itself on some damp day in the crevices of an old wall, or on a pile of rocks, its hirsute epidermis betrays its domicile, and often, under logs, it is found partially buried or "balled" in clay. When cleaned up, however, by gently brushing under tepid water, a method which preserves the hairs (and for

[1] Mohr, Plant Life of Alabama, pp. 34, 84, 600, and Plate VI. See also Gattinger, Flora of Tennessee, p. 114, where for "Limestone County," read "Madison County."

[2] Nautilus, Vol. XIX, p. 91.

[3] Nautilus, Vol XXI, pp. 129, 130.

[4] Nautilus, Vol. XIX, pp. 73, 74.

which important discovery we are also indebted to Professor Smith), it makes a most attractive appearance.

The following list cannot be complete, or even nearly so, as the writer was able to do only occasional field work in a busy pastorate of a single year at Huntsville. The species listed were collected partly on Monte Sano and partly from the contiguous territory. The determinations have been made largely by Mr. Bryant Walker, although I am indebted to Mr. Geo. H. Clapp and to Professor Smith for much help.

Gastropoda.

Helicidæ.

Helicina orbiculata Say. Common. Thousands may be gathered on damp days from the cedar trees or from the moss-grown limestone rocks. The *Pyramidulas* and *Pupidæ* are also lovers of cedar.

Helicinidæ.

Polygyra plicata Say.

Polygyra troostiana Lea. This and the preceding species are gregarious. But the one species is not apt to be found in association with the other.

Polygyra fraudulenta Pils. Common on all the mountains, but *Polygyra tridentata* Say, though probably here, was not collected.

Polygyra inflecta Say.

Polygyra albolabris Say.

Polygyra fuscolabris Pils. The racial validity of this species impresses the collector more than it would the student within doors. It is a shell of the mountain tops, choosing the crevices of large rocks and cave entrances preferably, though sometimes found under logs. It is not easy to bridge the gap between this and *albolabris* by a series collected in the same locality. The pink lip, however, is not a constant character, being nearly as often white as pink. But its larger size, splendid symmetry and richer color readily endorse it for specific rank.

Polygyra zaleta Binn. More common on the lower ridges. Here it often develops a lilac "bloom." *Polygyra elevata* Say, not found on Monte Sano, is reported from Gurley, Alabama, collected by Prof. Smith.

Polygyra palliata Say. Collected by Prof. Smith in the lowlands south of Huntsville, July, 1910.

Polygyra obstricta Say.

Polygyra obstricta carolinensis Lea. Between the species and the variety there is no dividing line.

Polygyra sargentiana J. and P. A young shell from the south end of Monte Sano is certainly this species. At Gurley, ten miles east of Huntsville, a smooth form of *sargentiana* is common, and will likely be found also on Monte Sano.

Polygyra appressa Say. Quite common in gardens.

Polygyra appressa perigrapta Pils. *Appressa* is the common form in this region, contrary to the usual collector's experience in North Alabama.

Polygyra thyroides, Say.

Polygyra spinosa, Lea.

Polygyra stenotrema, Fer.

Polygyra hirsuta, Say var. Differs constantly from typical hirsuta by its smaller size and pronounced apertural features.

Polygyra fraterna aliciæ, Pils.

Polygyra rugeli, Shutt.

Polygyra smithii, Clapp.

Bulimulidæ.

Bulimulus dealbatus, Say.

Pupillidæ.

Strobilops labyrinthica, Say, var.

Pupoides marginatus, Say.

Bifidaria procera, Gld.

Bifidaria armifera, Say.

Bifidaria tappaniana, C. B. Ads.

Vertigo rugosula, Sterki.

Vertigo ovata, Say.

Vertigo concinnula, Ckll. Very rare. Previously reported only from the Rocky Mountain region; determined by Dr. Pilsbry.

Circinariidæ.

Circinaria concava, Say.

Zonitidæ.

Omphalina kopnodes, W. G. Binn. This species attains its maximum development in this region. It is an abundant species, preferring the lower ridges rather the mountain-tops.

Mesomphix lævigata, Pfr.

Mesomphix lævigata latior, Pils. Save in a characteristic green color, this subspecies is almost inseparable from lævigata *ipse.*

Vitrea carolinensis, Ckll.

Vitrea indentata, Say.

Vitrea lewisiana, Clapp.

Vitrea (Paravitrea) capsella, Gould.

Vitrea radiatula electrina, var. circumstriata, Taylor. This shell has also been identified from Arkadelphia, Arkansas by Mr. George H. Clapp. The species may be found all the way between, but Arkansas is at present its southwestern limit.

Vitrea (*Paravitrea*) *multidentata* Binn. This extra-limital locality for *multidentata* evidences the keenness of Mr. Smith's eyes. It is very rare, and found only in sequestered cleavages of the rocks on the mountain terrace.

Euconulus chersinus Say.

Euconulus sterkii Dall. Only one specimen found.

Zonitoides arboreus Say.

Zonitoides minusculus Say.

Zonitoides milium Morse.

Gastrodonta suppressa Say.

Gastrodonta interna Say.

Gastrodonta ligera Say.

Gastrodonta g ilaris Say.

Gastrodonta demissa Binn.

Gastrodonta collisella Pils. Rare.

Endodontidæ.

Pyramidula alternata Say.

Pyramidula cumberlandiana Lea. Found on Smither's Mountain, a peak five miles northwest of Huntsville. Not on Monte Sano.

Pyramidula perspectiva Say.

Helicodiscus parallelus Say.

Punctum pygmaeum Drap.

Succinea sp.?

Lymnæidæ.

Lymnæa humilis Say.

Lymnæa columella Say.

Lymnæa obrussa Say (= desidiosa Binn.).

Ancylus sp.? Braham's Springs, west of Huntsville.

Ancylus sp. nov. Mastin's Lake, two miles north of Huntsville.

Ancylus sp. Collected from Braham's Springs, west of Huntsville.

Planorbis parvus Say.

Planorbis parvus Say, var. A minute form from Mastin's Lake, which may prove to be new.

Planorbis bicarinatus Say.

Planorbis alabamensis Pils.?

Planorbis trivolvis Say. Flat form.

Physidæ.

Physa sp. These shells collected in Mastin's Lake are probably *crocata* Lea (Walker), which is, however, only a form of *microstoma* Hald. (Crandall). See NAUTILUS, Vol. XV, p. 70.

Physa halei Lea. Braham Springs.

Physa distorta Hald. From Big Spring Creek.

Auriculidæ.

Carychium exile H. C. Lea.

Carychium nanodes Clapp.

Pleuroceratidæ.

Goniobasis striatula Lea.

Pleurocera excuratum Con.

Pleurocera brumbyi Lea. This and the two preceding species were collected from Big Spring Creek.

Pleurocera currierianum Lea. From Bird Spring.

In "The Fresh Water and Land Shells of Alabama," by Dr. James Lewis, M. D., *Goniobasis perstriata* Lea and *Goniobasis decampii* Lea are listed from Huntsville. But like many other species in our smaller streams, they may be already exterminated by the ducks and geese. *Campeloma lima* Anthony and *Somatogyrus currierianus* Lea are also given as coming from Huntsville, but I obtained no specimens.

Viviparidæ.

Vivipara contectoides Binn.

Campeloma coarctata Binn. (non Lea). From Bird Spring.

Pomatiopsidæ.

Pomatiopsis lapidaria Say.

Corbiculadæ.

Musculium elevatum Hald.
Pisidum virginicum Say.

NEW CALIFORNIAN MOLLUSCA.

BY WM. H. DALL.

During the later portion of the life of the late W. C. Goforth, he paid much attention to the natural history of the places in California which he visited, and made some collections which were transmitted to the U. S. National Museum after his death by a relative, Mrs. Emma C. Ingersoll. Among them were two or three small specimens of shells, supposed to have been collected at Monterey. Curiously enough, one of these specimens represents a species hitherto undescribed, and which it gives me pleasure to name in honor of the regretted collector.

Aesopus goforthi Dall, n. sp.

Shell smooth, slender, elongate, with inconspicuous sutures and about eight whorls; nucleus defective, smooth; subsequent whorls gradually increasing, moderately convex; color greenish-waxen with flammules of dark chestnut so arranged on the last whorl as to form two irregular bands, one above and the other below the periphery, which also show in the interior of the aperture and on the base of the pillar; the paler portion of the surface is also irregularly mottled with opaque whitish blotches. Aperture short, rather wide; the outer lip simple, sharp, smooth within; body and pillar smooth, with a thin wash of callus; canal short, wide, not recurved. Length of shell 13, of last whorl 6, of aperture 4 mm., max. diam. of shell 3.3 mm.

Type No. 249624, U. S. N. Museum.

While destitute of the spiral sculpture which marks many species of the genus, it is not without smooth congeners as, for instance,

Aesopus metcalfei Reeve, of the Antilles. The coloration recalls that of the common Californian *Astyris*.

An examination of the siftings dredged by Mr. C. W. Gripp, outside the Kelp beds off the entrance to San Diego harbor, in 16 to 20 fathoms, has resulted in the discovery of several interesting shells. *Mangilia interlirata* Stearns has its range extended southward from San Luis Obispo, A new species of *Rochefortia*, and a minute shell probably allied to the Corbulas, but requiring a new generic name, were among the prizes.

GRIPPINA Dall, n. g.

Shell slightly inequivalve, donaciform, small, with a well-marked, rounded, ascending pallial sinus; right valve receiving the dorsal edges of the left in grooves beneath its own dorsal margins; cardinal teeth two, large, subequal, prominent, horizontally produced and fitting under the beak of the left valve; resilium strong, compressed, situated between the two cardinals attached under the beak of the left valve, and having on its ventral surface a thin calcareous coating or ossiculum.

This genus differs from *Corbula* in the nearly equal valves, the distinct pallial sinus, and the absence of a resiliifer in the left valve; in *Corbula*, too, the posterior cardinal is rarely developed and always very inferior in size to the anterior tooth. The form of the teeth in the two genera is quite different. Type:

Grippina californica Dall, n. s.

Shell minute, subtrigonal, whitish, solid for its size, finely concentrically sculptured; beaks moderately elevated, smooth; inner margins of the valves smooth, the left valve with no hinge-plate; a narrow lanceolate lunule and subequal, similar escutcheon present; each bounded by a marked ridge; outside of the escutcheon a second radiating ridge extends from the beak to the lower posterior margin of the valves but without producing a notable angulation of the margin. Interior of the valves dull white, the muscular impressions and pallial line distinct. Length 2.5, height 1.2, diameter 0.7 mm.

For other details see the generic description.

Rochefortia grippi Dall, n. s.

Shell small, thin, equilateral, ovoid, with a dull brownish perios-

tracnm, more or less incrnsted with iron oxide, and sculptured only by feeble incremental lines. Beaks inconspicuous, hinge as in the genus, bearing two very small diverging cardinals in one valve with a rather strong resilium between them which seems to carry a small lithodesma; opposite valve edentulous; pallial line entire; inner margins of the valves simple. Length 4.5; height 2.5; max. diameter 1.3 mm.

This species is proportionately much more elongate than any of the other Pacific coast species and can be recognized at once by its form. All of the others are more or less conspicuously equilateral, and nearly all are larger.

Habitat: with the preceding. The species is named in honor of its discoverer. Only one specimen of this and the preceding species has been seen. The present specimen within the valves had a large number of minute smooth larval bivalves, but whether they belong to the same species is uncertain, since the specimen did not contain any of the fleshy portions of the animal.

NOTES ON ANODONTA COUPERIANA AND A. GIBBOSA.

BY L. S. FRIERSON.

In the "Synopis of the Naiades" of Mr. C. T. Simpson (1900), it is stated that the *Anodonta couperiana* Lea (with its variety *A. dunlapiana*), is a synonym of the *Anodonta gibbosa* Say. In this statement Mr. Simpson is followed by nearly all students who have handled the subject, rendering a difficult study still more confused. These species are quite distinct and belong to separate groups, and even possibly to *different genera.*

Anodonta couperiana is a fairly common species in most collections of any size. It is a handsome shell, with a bright, shining epidermis, and I am informed by Mr. T. Van Hyning that it very seldom cracks as other *Anodontas* are so prone to do. Its umbones are like those of *Anodonta imbecillis* Say, *i. e.*, they hardly rise above the hinge line. The corrugations are similar to the *imbecillis*, and some specimens verge towards the *Ano suborbiculata* of Say, which, despite its large size and different shape, belongs to the same group.

On the other hand, the *Ano. gibbosa* Say, is a rather rare shell and *generally misnamed.* It is remarkable for the great protuberance of its beaks and umbos, and the swelling of the umbos continues (with the growth of the shell) *downwards* and *backwards.* This peculiarity gained for the species its name. *A. gibbosa* belongs to the group of *cataracta* Say, having a double row of undulations on its beaks, and it is really very doubtfully distinct from this variable species.

Mr. Lea, having obtained specimens of this shell, in which the umbo to post-basal swelling was not very pronounced, he made a new species, which he called *A. dariensis.* The *gibbosa* being a rare shell, as such its identity has well-nigh been lost. For example, a *typical* specimen, so-called by the late G. W. Tryon, was labelled as *A. dariensis* by Mr. Simpson, and the *Anodonta dariensis* figured by Sowerby is a *gibbosa.* So also is the *gibbosa* figured by Sowerby (or Reeve) in plate XI, fig. 23. (This figure is not mentioned by Mr. Simpson). The shell is well figured also by Clessin, plate XVIII, figs. 3 and 4, under its proper name. Mr. Simpson refers these figures to *gibbosa* Say, correctly. But he also refers (as this species) to Sowerby's *couperiana,* and especially to Clessin, plate 50, figs. 3 and 4.

Evidently Mr. Simpson did not compare these figures with one another, for that Clessin's plate 50 figures 3 and 4, and plate 18, fig. 3 and 4 represent two entirely diverse species would be apparent to the veriest tyro. Couperiana, Lea (with *its variety* dunlapiana) then is to be recognized as a good species, and gibbosa, Say is also a good species with dariensis as a synonym, or at best a variety.

POLYGYRA ALBOLABRIS ALLENI WETH., AND OTHER MISSOURI HELICES.

BY F. A. SAMPSON.

Years ago when collecting shells at Eureka Springs, Arkansas, Charles C. Allen, then of that place, later of Florida, became interested in conchology, and a variety of *P. albolabris* found there was named for him by Prof. Wetherby, and it has since been decided that all of the *P. albolabris* west of the Mississippi and south of Iowa are of that variety.

I have in my collection specimens from sixteen counties in Missouri, and these vary greatly in size from 18 mm. to 32 mm. diameter. The largest is from Scott county in southwest Missouri; from Galena, Stone county they vary from 26 to 30 mm.; from Boone county from 23 to 30 mm.; and from Kansas City 18 to 27 mm.

The specimens from Kansas City are interesting, and the average size at two points within the City differs quite markedly. From an old cemetery near Main and 27th streets I collected more than ninety living shells, and from the bluffs about the Union Station I found eight dead shells; ths following table will show the sizes from the two places:

Diameter, Mm.	Cemetery.	Bluffs.
18	2	
18.5	2	
19	11	
19.5	7	
20	20	1
20.5	8	
21	16	
21.5	6	
22	7	
22.5	5	
23	5	1
23.5	1	2
24	1	1
24.5		1
25	1	1
27		1

At Boonville I found one dead but fresh shell of *Polygyra multilineata* Say, the only one I have found in the State. The *Polygyra dividesta* Gld., is found living in the southern counties of the State, and I have it from the Postpliocene at St. Joseph. From the Postpliocene of Boone and Moniteau counties I have the *Polygyra profunda* Say, but have not found it living in the State. To the NAUTILUS for June 1894, I noticed finding *Polygyra andrewsæ* W. G. B. in St. Francois county. I have *P. pennsylvanica* from St. Louis county, and from the Postpliocene of Boone county.

HENRY M. EDSON.

We deeply regret to announce the tragic death of Henry M. Edson, of Palo Alto, California. In alighting hastily from a car he was struck by a passing train, death resulting from the injuries received. He was 35 years of age and a native of New York. He had served in the army in the Philippines and received an honorable discharge. Of late years he became greatly interested in the study of mollusks, contributing a number of articles to THE NAUTILUS. His genial disposition won him many warm friends.

NOTES.

MODIOLUS DEMISSUS VAR. PLICATULUS LAM., IN BROOKLINE, MASS. Until two or three years ago this marine shell lived in a little piece of marsh at Cottage Farm, along the south side of Commonwealth avenue, between Essex and St. Paul streets, the marsh having an outlet under Commonwealth avenue and the Boston and Albany Railroad into the Charles River. The first improvement detrimental to the life of the mussels was the building of the dam forming the Charles River basin and shutting out the salt water from that part of the river. The persistent oiling of the ditches to destroy mosquitoes, and finally a public dump preliminary to forming a street, has so polluted the marsh as to undoubtedly cause their death.

C. W. JOHNSON.

POLYGYRA LAWÆ.—While examining some *Polygyra lawæ* Lewis, collected by Herbert H. Smith at Woodstock, Bibb county, Ala., I noticed that they are covered with very fine, short hairs arranged in diagonal rows. As this character is not mentioned in the description given in Binney's "Manual," p. 317, I examined four adults and one young in the Dr. James Lewis collection from Hayesville, N. C., and, while the shells have the appearance of being weathered, a magnification of 10 diameters showed the hair-scars. Perfectly fresh specimens have a beautiful silky lustre and the embryonic whorls are densely granulated like the *Stenotremas*.

GEORGE H. CLAPP.

1912.

SOCIETY FOR THE PROTECTION OF NATIVE PLANTS.

LEAFLET NO. 23.

A Plea for the Conservation of Wild Flowers.

BY GEORGE T. RUDDOCK.

The newspapers of April 21, 1911, displayed an item on activities of the teachers and children of the Oakland public schools in stripping the hills and forests of Alameda County of wild flowers. The children's department of the public library building was used to exhibit the flowers taken, the public was invited to inspect, and, doubtless, expected to approve and applaud. The publications detailed the localities allotted to the several schools, and impressed the idea of competition in quantities to be gathered.

It may have been the purpose of the initiators of the outing to make it educational. Then why the reserved space for exhibition? A few specimens of each kind collected in the fields and properly presented by the teacher would have been effective. . . .

Such an outing always resolves itself into competitive vandalism,—without design perhaps, but with that inevitable result. Field flowers cautiously plucked may serve for exhibition or decorative purposes; but few persons are temperate enough in their desires, or sufficiently thoughtful to pick them with the best effect and least violence to the fields.

The æsthetic duty of wild flowers is to adorn the fields: their especial mission is to produce seed to perpetuate the species and, coincidentally, to furnish food for other life forms. To destroy the seeding capacity is to end the life history of the plant in the locality. Wild flowers propagate mostly by seed. In order to insure reproduction, they bear these in large quantities, but with a low percentage of germination. These few fertile seeds must escape destruction by fire, birds, rodents, insects, and grazing animals before new plants can be

produced to struggle on to flowering maturity. All of these deterrents are normal: when the human element of destructiveness is added, the end is in sight.

Cultivated plants have the advantage of protection, care, and assistance. They are gathered more sanely, and no such destructive manner of picking would be tolerated by the enthusiasts who pluck up wholly immature plants in the field. As stated, the æsthetic duty of wild flowers is to attract—in the fields: there they should be enjoyed and allowed to remain for the enjoyment of others. . . .

If the children be trained in this department of nature study, let it be done in the fields. Instead of one trip of destruction, let many be made to study the flowers, their environment and purposes; and at appropriate times to gather and distribute seeds to assist in the conservation of the plants in their unmatchable beauty as intended by nature.

[Reprinted from the Sierra Club Bulletin of January, 1912, by permission of the author.]

For more leaflets apply to Miss M. E. Carter,
Boston Society of Natural History, Boston.

SOCIETY FOR THE PROTECTION OF NATIVE PLANTS.

LEAFLET NO. 22.

I am most heartily in sympathy with the plan for protecting our wild flowers, and the green laurel of the Massachusetts hills. We have no right to rob those who will come after us of such things as these. I sometimes feel when I see the poor unlovely leafless bunches of May flowers sold along our city streets in Spring, that I should like, at least, to limit everybody to a single flower and the leaves that belong to it, and to help promote a serious society for that purpose.

Sarah Orne Jewett

For more Leaflets apply to Miss M. E. Carter, Boston Society of Natural History, Boston.

The Nautilus.

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OREOHELIX COLONIES IN COLORADO.

BY JUNIUS HENDERSON.

The native species of land snails in Colorado are mostly small—from the size of *Pyramidula cockerelli* down to *Vertigo* and *Vallonia*. The only known exception is the genus Oreohelix, which is much better represented, both in numbers of species and abundance of individuals, than has generally been supposed. My first experience with the genus was along the eastern foothill belt of the Rocky Mountains, the eastern limit of its range in Colorado. There I found *Oreohelix strigosa depressa* Cockerell (then considered *O. strigosa*), very generally but sparingly distributed, never obtaining more than half a dozen live or freshly dead specimens. Several facts led to the natural conclusion that the genus was approaching extinction in Colorado. (1) The scarcity of live specimens along the foothills. (2) The occurrence of large numbers of fossil specimens in a small exposure near Boulder, taken in connection with the widespread belief in a marked desiccation of the West and Southwest since middle Pleistocene time, which would make conditions less favorable for these snails. (4) Ingersoll's report (Hayden Survey, Ann. Rept., 1874, p. 396; Binney's Land Shells, p. 166) that dead *O. cooperi* were abundant in North and Middle Park, but that live ones were not common. (4) Numerous dead shells received from various localities west of the Continental Divide, with no live ones. (5) The occurrence of *O. haydeni* fossil in large numbers near Glenwood Springs, with no live or freshly dead ones reported.

More recent discoveries have rendered that view wholly untenable.

During the past five years all the species of the genus now known to inhabit Colorado have been found alive in flourishing colonies, so that it seems probable they are as abundant as they ever were.

The first important colonies to come to my attention were of *O. haydeni* Gabb and variety *gabbiana* Hemphill, discovered on the bluff above the Hotel Colorado, at Glenwood Springs, by the well-known botanist and naturalist, Professor E. Bethel, of Denver. The colonies were in close proximity, one above the other. They were on limestones, sandstones and calcareous shales. *O. haydeni* was easily recognized, but the others were sent to Dr. Pilsbry, who wrote:

"The shells are indistinguishable from *O. haydeni gabbiana* Hemphill. It is also to be noted here that Hemphill found *gabbiana* and a form with strong spirals, hardly separable from typical *haydeni*, on the same mountain-side, though in separate colonies."

Unfortunately Professor Bethel's vivid and interesting description written at the time, was lost in transit to Dr. Pilsbry, and I have never been able to get him to attempt to rewrite it.

Later Mr. Albert Dakan, of Longmont, visited the locality and collected both species, though I am not certain that they are from exactly the same colonies. He locates his *haydeni* colony on a limestone formation "on the mountain-side on the north side of the Grand River just above the point where the Glenwood water-main crosses it." His *gabbiana* colony he places on Blocks 51 and 52 of the town plat. His account of *gabbiana* throws such light on the habits of the genus, is so in accord with my own experience elsewhere, and so well explains why live *Oreohelix* have not been found abundantly in the State by earlier collectors, that I feel justified in quotting it somewhat fully, as follows:

"While returning from a little climb on the hill at the northeast corner of the town, on the afternoon of April 8, 1908, I noticed a few snails, and gathered what scattering ones I could find on a zig-zag course down the hill-side. I had gathered up nearly a handful, when suddenly one that was in my fingers showed signs of life. This aroused a lively interest in the search, but it was some little time before the second live one was found. After that they were easy to find. My hands were soon full, but mostly of dead ones. Not caring to discard any of them I went to the foot of the hill and ot a three-pound lard pail and then went after them in earnest.

The hill-side is covered, though not thickly, with low brush and scattered bunch-grass. The earth is of disintegrated calcareous shale. Under the clumps of bushes was a sprinkling of dead leaves matted down by the winter's snows. Here were snails by the hundred. It was a populous city of slow-feet all out on parade. There had been light showers during the afternoon. The ground was very damp, but not muddy. Everywhere the snails were erect, and as the eye became accustomed to their appearance when in motion their numbers seemed to greatly increase. I soon had over a pint of live specimens—enough, it would seem to satisfy anyone that there is one place at least in Colorado where lack of numbers and difficulty of access cannot be pleaded as an excuse for not knowing more of the habits of this creature. Two days after the above find I returned to the snail city in company with Mr. Underwood, principal of the local high school. Neither he nor his instructors knew of the existence of the live snails so near town. It was about five o'clock in the afternoon. The weather had cleared up and the hill-side was comparatively dry. I had been enthusiastic in telling of the number of snails to be found, so was not a little surprised in not finding immediate verification of my story. Indeed, very few were to be found. I went from clump to clump of bushes, each time disappointed, for, where two days before there were hundreds, now none could be seen. Then I began a closer search. Snail habits were unknown to me, but their ability to hide so effectively was about the last thing thought of. We soon began to find them under sticks, roots, bunch-grass and stones, and in the small crevices of the loose earth. None of them had migrated. Under one protecting stick a dozen or more were found. Soon we had nearly a pint of shells, each full of life. It was then easy to understand why they had not been discovered. Human pedestrians do not choose drizzly days for their strolls, while such weather is the snail's delight. But in dry weather they very effectually hide themselves. It is easy to find the bleached, white, empty houses of the dead, while in life the snails are so nearly the color of the ground that they easily escape notice. In fact, it would be hard for the untrained eye to see them even when exposed to view. This I appreciated more fully after I had placed about a dozen of them on the ground near the rear wall of my home. The ground was dry and the snails were soon practically out of sight. I have been speaking of them in hundreds, but after a

more careful view will increase to thousands the numbers which may be seen under favorable conditions. Several pairs were observed in the act of copulation—in fact, this was a very common thing on this visit."

Mr. Dakan found another colony of *gabbiana* at Newcastle, where he collected over a thousand live ones in twenty minutes. Since then I have collected all along the Grand Hogback from Newcastle to Meeker and north to Axial, up White River to Trapper's Lake and Marne Lakes, in North Park and Middle Park, and everywhere under favorable conditions have found the shells of this genus in great abundance, each species usually occupying a colony by itself, though in some instances they intermingled. While scattering ones are found elsewhere, they are abundant only on slopes or ledges of limestones or calcareous soils or shales, where there are bushes of various kinds. They are found indifferently under sage brush, wild rose bushes, mountain mahogany, *Amelanchier* and many other bushes, but are not often abundant under aspens or oaks, in this respect differing from the smaller species of snails. Loamy, willow-covered bottom-lands do not appeal to them. Where they occur in numbers they are easily found alive on moist days, when it is raining or the bushes are dripping with fog or dew. I have seldom found other snails common where *Oreohelix* are abundant.

Without attempting to enumerate all the localities from which a few specimens have been collected, I give below a summary of the more important colonies and some other records to show the general distribution of the species, the collector's name being given except where I conducted the material myself, these records being all based upon material in the University of Colorado Museum.

Oreohelix strigosa depressa Ckll.

To this form I have assigned all our Colorado material formerly considered *strigosa*. Present but not abundant usually along the eastern foothills of the Front Range from Pueblo to Belleview. The finest specimens we have are a few from an altitude of 11,000 feet on Mt. Audubon (A. Mackenzie, 1905), one very strigose specimen from near Ohio City, at 11,800 feet (Frank Rohwer). A few are from Treasury Mountain, Gunnison county, at 10,900 feet (Prof. R. D. George). The highest record is from 14 miles west of Leadville, at 12,700 feet (H. A. Aurand). Binney and Cockerell have

recorded it from Durango. A thriving colony was found just north of Morrison (Rohwer).

I visited this colony on September 23 with Mr. Rohwer, and find it the most remarkable yet discovered east of the Front Range. Though scattered snails were found over the whole slope above, they were abundant only under three small groups of skunk-bush (*Rhus trilobata* Nutt.), where the soil contained many fragments of limestone which had slid down from up the slope, the aggregate area of the groups covering less than 100 square feet. Under one root were 46 specimens clinging one to another in a cluster. As they average over three-fourths of an inch in major diameter, one may imagine the size of the cluster. On the under surface of a board on an area of 48 square inches, 98 were found, making almost two layers. Under a rock 5 by 6 inches were 23. Within a radius of 8 inches were 80. These were all alive. In a short time we collected 953 live ones. Though the weather had been exceedingly dry and warm for weeks, they were scarcely buried, the soil being too hard for them to burrow into had they wished to, except an inch or so of debris and leaves on the surface. In digging we found none deeper than 3 or 4 inches, none below the loose debris, mostly barely covered and many exposed, but all dormant. We carried them home in a box and the combined moisture of the mass seemed sufficient to awaken them, so that the next day they were all active and their shells moist. This may suggest the reason for clustering in this semi-arid region.

With this exception, the finest colony yet reported is one I found last August north of the river a mile below Steamboat Springs, on a steep, dry, south-facing slope of lower Mancos Cretaceous shales and limestone. Time was too limited for much collecting. At the first point of contact with the colony *O. cooperi* predominated, while less than half a mile to the west *depressa* predominated, thus: At the west 112 *depressa* and 16 *cooperi* collected; at the east 106 *cooperi* and 77 *depressa*. Hot, dry weather, live snails well concealed. A considerable proportion of both species were quite dark and many showed the color characters of *O. s. albofasciata* Hemphill, the upper dark band extending to the suture, the lower one to the umbilicus, with a white band on the periphery, but other examples showed complete gradation into the typical forms. As I have found this variation and gradation in other colonies of each of the two species, and finding none that cannot be referred to one or the other, the record

of *albofasciata* should be eliminated from the Colorado list. Not having seen Utah specimens of Hemphill's sub-species, I cannot say whether it is valid.

Oreohelix cooperi (W. G. B.)

I have seen no live ones east of the Front Range, and but few dead or fossil ones, but it is exceedingly abundant on the outcrops of lower Mancos (or Niobrara and Benton) cretaceous limestones and calcareous shales, nearly everywhere I have been west of the Front Range, as well as on the Mesa Verde sandstone slopes at Rio Blanco and at Axial, probably where thin limestone bands in the sandstone furnished lime for the soil. Also found it more sparingly up White River to Trapper's Lake, 10,000, feet. Abundant dead but fresh shells have been found on the Laramie, North Park, near Gleneyrie (Wm. Fleming). Probably a search would have revealed a strong living colony. A flourishing colony of large live ones occurs at Montrose (Bethel) and a few dead ones came from Wolcott. There are many fine colonies on the Benton and Niobrara formations in the valley of Muddy Creek, north of Kremmling, Middle Park. One of the best is about 25 miles north of Kremmling, on a dry, unmixed sage brush terrace, with no protection except the scattered and dwarfed sage a foot or two high, yet the shells are about of normal size. On a south-facing, brush-covered slope of calcareous shales, on the north side of the creek where the wagon road from Kremmling to Steamboat Springs crosses the southwest corner of North Park, on a moist morning last July I collected 511 active specimens in a short time on a distance of 72 feet along the trail, without including the numerous young ones and only taking those easily seen without searching. At one point there were 19 crawling about within a radius of five inches. Altitude 8,860 feet. In adjacent bottomlands, where a black loam was covered by scrub willows, there were no snails. Ten were found in an aspen grove half a mile away, including one albino. At Rio Blanco a thriving colony was found under aspens, and at Newcastle a fine lot were obtained from beneath narrow-leaved cottonwoods. At Steamboat Springs, in addition to the mixed *strigosa-cooperi* colony, I found a pure *cooperi* colony, yielding abundant very robust specimens, on the west side of the river above the town. The center of abundance was in a narrow-leaved cottonwood grove on a steep, east-facing slope,

where the soil probably receives considerable lime from the limestones further up the slope. Altitude 7,000 feet. The snails were hiding under rose, sage and other brush, but not hard to find. The colony extended over the whole slope, but individuals were scarce in the aspen and scrub-oak groves. Throughout the whole region I have not found the snails abundant on the non-calcareous formations.

(*To be concluded.*)

A REVISION OF THE ANCYLI OF SOUTH AFRICA.

BY BRYANT WALKER.

Several months ago Messrs. H. C. Burnup of Maritzburg, Natal, John Farquhar of Grahamstown, Cape Colony, and John Ponsonby and M. Connolly of London, placed in my hands for examination a large collection of the *Ancyli* of South Africa. In order that the results of the investigation might be available for immediate use elsewhere, the following summary has been prepared. A fully illustrated report with complete bibliographic references, comparative remarks, etc., is in preparation and will be published in the immediate future.

The region included in the report is bounded on the north by the Zambesi and Kunene rivers.

Genus ANCYLUS Geoffroy.

Section *Burnupia* n. sec.

Shell dextral; apex punctate, in a more or less radial pattern.

Type: *Ancylus caffer* Krauss.

I. *Ancylus caffer* Krauss.

1848. *Ancylus caffer* Krauss, Sudafr. Moll., p. 70, pl. 4, fig. 13.

1859. *Ancylus gaulus* Gould, Pr. B. S. N. H., VII, p. 40.

Type locality: (*caffer*), Pietermaritzburg, Natal.

(*gaulus*), Cape of Good Hope.

Also: Umkomaas; Imputyni stream near Maritzburg; Inkwalini stream near Maritzburg; Tongaat; and Equeefa River, Natal (Burnup).

Var. *nanus* n. v.

Shell smaller than typical *caffer*, proportionately shorter and

broader, being obovate rather than oval; apex less depressed; dark brown.

Length 4.5, width 3.5, alt. 1.75 mm.

Type locality: Karkloof stream, Natal (Toynton). Also: Maritzburg, Natal (Ponsonby).

Type, No. 36002, coll. Walker.

Var. *gordonensis* Melv. and Pons.

1903. *Ancylus* (*Ferrissia*) *gordonensis* M. and P., A. M. N. H., xii, p. 606, pl. xxxi, fig. 2.

Type locality: Gordon Falls, near Pietermaritzburg, Natal. Also, Edendale Falls, Umzindusi River; Howick Falls, Umgeni River; Nottingham Road; Town Bush Valley stream, Maritzburg; Sweetwater stream near Maritzburg; Aarvogel Krantz, Umgeni River; Dargle, Umgeni system (Burnup); Karkloof stream (Burnup and Morton) and Umgeni River, Natal (Ponsonby); Zoutspansberg, Transvaal (Cragoe).

Var. *farquhari* n. v.

Much smaller than typical *gordonensis*, to which it is most closely allied; thicker and darker; apex more prominent, but scarcely at all depressed.

Length 4.8, width 3.75, alt. 2 mm.

Type locality: York, East Griqualand (Farquhar). Also, Teko River, Transki (Hickey).

Type, No. 36003, coll. Walker.

Var. *stenochorias* Melv. and Pons.

1903. *Ancylus* (*Ferrissia*) *stenochorias* M. and P., A. M. N. H., xii, p. 607, pl. xxxi, fig. 1.

1853.? *Ancylus obliquus* Krauss, in Kuster Con. Cab., Ancylus, pl. 1, figs. 18–20, *non* Brod. and Sby., 1832.

1882.? *Ancylus caffer* Clessin, Con. Cab., Ancylus, p. 36, pl. 1, figs. 18–20.

1889.? *Ancylus caffer* Morelet, J. de Con., xxvii, p. 20.

Type locality: Ebb en Vloed, Port Elizabeth, Cape Colony. Also, Van Staden's River and Bog Farm, Port Elizabeth (Ponsonby); Bakken's River, Port Elizabeth (Farquhar); Upper Retreat and Klipplatz River, Cathcart (Ponsonby); Kaiser River, Montagu (Connolly); King William's Town Road Dam and Kowie River, Grahamstown (Farquhar).

Var. *capensis* n. v.

Shell rather thin, translucent, oval, brownish horn color, darker on the apex; surface with fine, regular growth-lines and very fine, close, somewhat irregular radial striæ; apex prominent, subacute, strongly turned to the right, but not much deflected except at the extreme tip; anterior slope convex, somewhat flattened towards the apex; posterior slope concave; right slope convex; left slightly concave.

Length 7.5, width 4.5, alt. 2.5 mm.

Type locality: Lakeside, Cape Peninsula (Connolly). Also, Hoot Bay, Cape Peninsula (Connolly); Woost Hill River and Blaukrantz River, Grahamstown (Farquhar).

Type, No. 36004, coll. Walker.

Var. *trapezoideus* O. Bœttger.

1907. *Ancylus trapezoideus* O. Bœttg., in Schultze, "Aus Namaland und Kalahari," p. 708,

1910. *Ancylus trapezoideus* O. Bœttg., Abh. Senckenb. Naturf. Ges., Frankfurt, xxxii, p. 45, pl. 28, fig. 15.

1897.? *Ancylus caffer*, v. Mts., Beschalte, p. 151, pl. 1, fig. 19a, c and d.

Type locality: Witkop, British Bechuanaland. Sub-fossil. Also, Pretoria (McBean); Pretoria District (Connolly); Valsch River, Lindley, Orange Free State (Connolly); Crocodile Drift, Transvaal (Connolly); Zoutspansberg, Transvaal (Cragoe); ? Bach Tararo, Umdussuma (Stuhlmann).

II. *Ancylus mooiensis* n. sp.

Shell slightly obovate, the greatest width being in front of the center; thin, translucent, shining, light horn-color; surface with regular, but very fine, growth-lines and exceedingly delicate, wavy, radial striæ; apex about half-way between the center and the posterior margin, subacute, not prominent, but slightly turned to the right and very little deflected; anterior slope convex, but flattened above and nearly straight as it approaches the anterior margin; posterior slope long and regularly, but not deeply, concave; right slope slightly convex; left nearly straight, slightly concave about half-way down.

Length 6.25, width 3, alt. 2.5 mm.

Type locality: Mooi River, Potschefstroom, Transvaal (Livingston).

Type, No. 36005, coll. Walker.

Var. *dubiosus* n. v.

Shell narrower; apex more obtuse, less prominent and decidedly turned to the right.

Type locality: Pienaars Poort near Pretoria (Connolly). Also, Woost Hill River. Grahamstown (Farquhar).

Type, No. 36006, coll. Walker.

III. *Ancylus transvaelensis* Craven.

1880. *Ancylus transvaalensis* Craven, P. Z. S., London, 1880, p. 617, pl. lvii, fig. 11.

1907.? *Ancylus* (*Ferrissia*) *stenochorias* O. Boettger, in Schultze, "Aus Namaland und Kalahari," p. 708.

1910.? *Ancylus* (*Ferrissia*) *stenochorias* O. Boettger, Abh. Senckenb. Naturf. Ges. Frankfurt, xxxii, p. 450.

Type locality: Mooi River, Transvaal (Craven). Also, Pretoria District, Transvaal (Connolly); Vereeniging, Orange Free State (Johnson); Prieske, Orange River system, Cape Colony (Ponsonby);? Witkop, British Bechuanaland (Boettger).

IV. *Ancylus verreauxii* Bourguignat.

1853. *Ancylus verreauxii* Bgt., Rev. et Mag. de Zool., 1853, p. 351.
1854. Bgt., *ibid.*, 1854, pl. 1, fig. 1.
1856. Bgt., Amen. Mal., p. 12, pl. 1, fig. 1.
1882. Clessin, Con. Cab., Ancylus, p. 60, pl. 5, fig. 4.

1862. *Ancylus verreauxii* Bgt., Spicil. Mal., p. 194.

Type locality: "Ville de Constance," Cape of Good Hope. Also, Retreat, Cape Peninsula (Connolly).

Section *Ferrissia* Walker, 1903.

Ferrissia Walker, NAUTILUS, XVII, p. 15.

Type, *Ancylus rivularis* Say.

V. *Ancylus burnupi* n. sp.

Shell small, depressed, long oval, lateral margins nearly parallel, only slightly convex, the left more than the right, anterior margin

regularly rounded, posterior margin more or less obliquely truncated on the right side; very thin, diaphanus, translucent, white, shining, polished; lines of growth regular, but minute; anterior surface with faint, irregular, radial ripples; apex about half way between the center and posterior margin, obtuse, scarcely projecting and slightly turned to the right; anterior slope but slightly convex; posterior nearly straight; a little concave in the center; right slope slightly convex; left nearly straight.

Length 4; width 2.2; alt. 1 mm.

Type locality: Equeefa River, Natal (Burnup). Also, Brack Kloof River, Grahamstown, Cape Colony (Farquhar).

Type, No. 36007, coll. Walker.

VI. *Ancylus connollyi* n. sp.

Shell small, subconical, oval, lateral margins nearly parallel, the left slightly more convex, anterior and posterior margins regularly rounded; thin; translucent, light horn-color, almost white; growth-lines fine, rather irregular, anterior surface somewhat wrinkled transversely; apex about one-fifth from the posterior margin, obtuse, prominent, slightly turned to the right; anterior alone slightly convex; posterior slightly concave, nearly straight; lateral slopes nearly straight, the right a little convex.

Length 3.75; width 2.2; alt. 1.5 mm.

Type locality: Black River, Maitland, Cape Colony (Connolly). Also, King William's Town Road Dam, Grahamstown, Cape Colony (Farquhar).

Type, No. 36008, coll. Walker.

VII. *Ancylus equeefensis* n. sp.

Shell small, depressed, oval, the left margin slightly more curved than the right; anterior and posterior margins regularly rounded; thin, light horn-color; lines of growth fine and regular; apex close to posterior margin, very obtuse, but not prominent, distinctly turned to the right; anterior slope straight, except as it slightly curves towards the apex, posterior nearly straight from below the apex for two-thirds of its length, thence oblique to the margin; right slope slightly convex; left a little concave.

Length 3.75; width 2.1; alt. 1 mm.

Type locality: Equeefa River, Natal (Burnup).

Type, No. 36009, coll. Walker.

VIII. *Ancylus fontinalis* n. sp.

Shell small, depressed, long, oval, narrow, lateral margins parallel and nearly straight, anterior margin regularly rounded, posterior margin slightly truncated on the right side; thin, white; growth-lines very fine and regular; apex about half-way between the center and the posterior margin, rounded, obtuse, quite prominent, only slightly turned to the right; anterior slope long and nearly straight; posterior slope oblique, straight from the base of the apex to the margin, lateral slopes oblique, nearly straight, slightly incurved towards the margin.

Length 3.25, width 1.8, alt. 0.8 mm.

Type locality: Ranjesfontein, Pretoria District (Connolly). Also, Morgendal, Orange River Colony and Pienaars Poort, Pretoria (Connolly).

Type, No. 36010, coll. Walker.

IX. *Ancylus victoriensis* n. sp.

Shell minute, rather narrow, slightly obovate, the greatest width being at the anterior third of the length, anterior and posterior margins regularly rounded, lateral margins slightly curved, the left more than the right; thin; light greenish horn-color; lines of growth rather coarse and irregular, more or less rippled on the anterior slope; apex posterior, large, prominent, obtuse, scarcely, if at all, turned to the right; anterior slope very convex; posterior slope very short, nearly straight and scarcely oblique; lateral slopes about equally convex, the apex being in the longitudinal axis of the shell.

Length 2.25, width 1.5, alt. 0.75 mm.

Type locality: Victoria Falls, Zambesi River (Connolly).

Type, No. 36011, coll. Walker.

X. *Ancylus zambesiensis* n. sp.

Shell minute, subdepressed, short oval, anterior and posterior margins broadly rounded, lateral margins about equally curved; light greenish horn-color; surface with lines of growth distinct and irregularly rippled on the anterior slope; apex rather prominent, obtuse, in the longitudinal axis of the shell and not perceptibly turned to the right; anterior slope slightly convex; posterior slope oblique and straight; lateral slopes oblique and only slightly convex.

Length 2.25; width 1.6; alt. 0.75 mm.

Type locality: Victoria Falls, Zambesi River (Connolly).

Type, No. 36012, coll. Walker.

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